# *Rediscovering the Principles of Nature*: An Explication of St. Thomas Aquinas's Hylomorphic Doctrine and a Defense of this Doctrine against Some Ancient and Modern Objections

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in Signum Grati Animi
et Filialis Obedientiae
Auctor
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**List of Abbreviations**

| | |
|---|---|
| *De ente* | *De Ente et Essentia* |
| *De malo* | *Quaestiones Disputatae de Malo* |
| *De mixtione* | *De Mixtione Elementorum* |
| *De potentia* | *Quaestiones Disputatae de Potentia Dei* |
| *De spir. creat.* | *Quaestiones Disputatae de Spiritualibus Creaturis* |
| *De sub. sep.* | *Quaestiones Disputatae de Substantiis Separatis* |
| *De veritate* | *Quaestiones Disputatae de Veritate* |
| *De virtutibus* | *Quaestiones Disputatae de Virtutibus* |
| *De anima* | *Quaestiones Disputatae de Anima* |
| *DPN* | *De Principiis Naturae* |
| *In de Anima* | Commentary on the *On the Soul* of Aristotle |
| *In de Caelo* | Commentary on the *On the Heavens* of Aristotle |
| *In de Causis* | Commentary on the *Book of Causes* |
| *In de Div. Nom.* | Commentary on the *On Divine Names* of Dionysius |
| *In de Gen.* | Commentary on the *On Generation and Corruption* of Aristotle |
| *In de Trin.* | Commentary on the *De Trinitate* of Boethius |
| *In Ethic.* | Commentary on the *Nicomachean Ethics* of Aristotle |
| *In Phys.* | Commentary on the *Physics* of Aristotle |
| *In Polit.* | Commentary on the *Politics* of Aristotle |
| *In Post. Ana.* | Commentary on the *Posterior Analytics* of Aristotle |
| *In Metaphys.* | Commentary on the *Metaphysics* of Aristotle |
| *In Sent.* | Commentary on the *Sentences* of Peter Lombard |
| *Quod.* | *Quaestiones Quodlibetales* |
| *SCG* | *Summa Contra Gentiles* |
| *ST* | *Summa Theologiae* |

* The volume numbers, page numbers and, in some cases, paragraph numbers which follow the citations of these texts are from the editions specified in the bibliography. The text of the Leonine edition was utilized when available. Also, unless otherwise noted, the translations of St. Thomas's works are my own.

## Preface

The present essay concerns itself with answering a single question, namely, *Quid sint principia naturae*? This question is itself a venerable one; it is as old as philosophy itself. This question, furthermore, is almost the first question that is addressed in natural philosophy,[1] and, in the order of learning, natural philosophy has traditionally been seen as the first philosophical study which man makes of the physical world.[2] It seems, then, that the question, *Quid sint principia naturae*?, is quite fundamental to philosophy.

Moreover, it is of the utmost importance that we answer this question correctly. For the response that we give will have inescapable consequences both for natural philosophy and for many other parts of philosophy. Concerning this, St. Thomas notes that Avicebron's false answer to this question not only explicitly denied the truth about the first matter which underlies all change, but also caused him to deny the principles of logic, the foundations of natural philosophy, and the principles of metaphysics.[3]

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[1] The qualifier "almost" is added here since, if we follow the order of proceeding which Aristotle sets forth in the first book of the *Physics*, then it is clear that the question, "How ought we to proceed in natural philosophy?," is asked and answered (i.e., in *Physics*, Bk. 1, ch. 1) before the question, "What are the principles of nature?," is taken up.

[2] Regarding the proper order of learning, St. Thomas has the following to say: "Erit ergo hic congruus ordo addiscendi, ut primo quidem pueri logicalibus instruantur, quia logica docet modum totius philosophiae. Secundo autem instruendi sunt in mathematicis quae nec experientia indigent, nec imaginationem transcendunt. Tertio autem in naturalibus, quae, etsi non excedant sensum et imaginationem, requirunt tamen experientiam; quarto autem in moralibus, quae requirunt et experientiam et animum a passionibus liberum, ut in primo habitum est. Quinto autem in sapientialibus et divinis quae transcendunt imaginationem et requirunt validum intellectum." *In Ethic.*, Bk. 6, *lectio* 7, vol. 47, pp. 358-359.

[3] See, for example, *De sub. sep.*, ch. 6, vol. 40, p. D 50 : "Sic haec positio tollit quidem veritatem materiae primae, quia si de ratione materiae est quod sit in potentia, oportet quod prima materia sit omnino in potentia: unde nec de aliquo exsistentium actu praedicatur, sicut nec pars de toto. Tollit etiam logicae principia, auferens veram rationem generis et speciei et substantialis differentiae, dum omnia in modum accidentalis praedicationis convertit. Tollit etiam naturalis philosophiae fundamenta, auferens veram generationem et corruptionem a rebus, sicut et antiqui naturales ponentes unum materiale principium. Neque enim simpliciter aliquid generari dicitur, nisi quia simpliciter fit ens. Nihil autem fit quod prius erat. Si igitur aliquid prius erat in actu, quod est simpliciter esse;

In this essay I shall attempt to show that St. Thomas Aquinas's answer to this question is in fact the true one. Based on his understanding of Aristotle's works,[4] St. Thomas maintains that the natural substances in the world around us come to be from first matter, substantial form, and the privation of substantial form. More specifically, St. Thomas holds that natural substances come to be from first matter and substantial form *per se*, while they come to be from the privation of substantial form *per accidens*. Hence, these natural substances are essentially composites of first matter and substantial form. Now St. Thomas understands first matter to be nothing other than pure passive ability or what, according to its very essence, is able to receive substantial form.[5] Substantial form, on the other hand, is that intrinsic principle by which a natural substance is simply speaking. In St. Thomas's words, "...because form makes [something] to be in act, therefore, form is said to

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sequetur, quod non simpliciter fiat ens sed fiat ens hoc quod prius non erat: unde secundum quid generabitur, et non simpliciter. Tollit demum, et ut finaliter concludam, praedicta positio etiam philosophiae primae principia, auferens unitatem a singulis rebus, et per consequens veram entitatem simul et rerum diversitatem."

[4] There is question amongst scholars as to whether St. Thomas's understanding of Aristotle's hylomorphic doctrine is in fact true to Aristotle's texts. Many, for example, question whether Aristotle truly holds to the doctrine of the pure potentiality of first matter which St. Thomas and many others attribute to him. On this point see, Christopher Byrne, "Prime Matter and Actuality," *Journal of the History of Philosophy* 33 (1995), pp. 197-224; William Charlton, "Prime Matter: A Rejoinder," *Phronesis* 28 (1983), pp. 197-211; B. Jones, "Aristotle's Introduction to Matter," *Philosophical Review* 83 (1974), pp. 474-500; Hugh R. King, "Aristotle without Materia Prima," *Journal of the History of Ideas* 17 (1956), pp. 370-389; and Dennis F. Polis, "A New Reading of Aristotle's *Hyle*," *The Modern Schoolman* 68 (1991), pp. 225-244. On the other hand, there are many who readily defend St. Thomas's understanding of first matter to Aristotle himself. See, for example, Fr. Norbert Luyten, O.P., "Matter as Potency," in *The Concept of Matter*, ed., Ernan McMullin (South Bend, IN: Notre Dame University Press, 1963), pp. 122-133; Fr. Joseph Owens, "Matter and Predication in Aristotle," from *Aristotle: The Collected Papers of Joseph Owens*, ed. John P. Catan (Albany NY: State University of New York Press, 1981), pp. 35-47; H. M. Robinson, "Prime Matter in Aristotle," *Phronesis* 19 (1974), pp. 168-188; F. Solmsen, "Aristotle and Prime Matter: A Reply to Hugh R. King," *Journal of the History of Ideas* 19 (1958), pp. 243-252.

In this essay, I shall, as much as possible, abstract from the historical consideration of whether St. Thomas's understanding of Aristotle's doctrine is actually *secundum mentem Philosophi*. While I think that finally both St. Thomas and Aristotle are of one mind on this topic, it will be enough if this essay is able to show that St. Thomas's *understanding* of Aristotle's answer to the question, *Quid sint principia naturae*?, is actually correct.

[5] ...materia secundum suam essentiam est potentia ad esse substantiale. *In Phys.*, Bk. 1, *lectio*, 15, vol. 2, p. 52..

be 'act.' But that which makes substantial existence to be in act is 'substantial form'..."[6] Lastly, the privation of substantial form consists in the non-being or absence of a substantial form in first matter. In summary form and without any of its implications spelled out, this is the essence of St. Thomas's hylomorphic doctrine.

At this point, one might legitimately wonder why it is worthwhile to spend a monograph worth of ink explicating and defending St. Thomas's answer to the question, *Quid sint principia naturae*?, even if his answer is in fact true. Has not his teaching on this matter already received enough treatment in recent scholarly literature? Certainly, to this day, St. Thomas's hylomorphism has both its critics and defenders.[7] This being said, it is also true to say that it is difficult to find any recent monograph-length works in English which both explain and defend this doctrine "from the beginning,"[8] as it were, and enter into careful discussions regarding some of the more important details of St. Thomas's texts on these matters.[9] That is, one can find various contemporary defenses

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[6] ...quia forma facit esse in actu, ideo forma dicitur esse actus; quod autem facit actu esse substantiale est forma substantialis... *DPN*, ch. 1, vol. 43, p. 39.

[7] For some critics and defenders of St. Thomas's hylomorphism, one can again make reference to footnote 4 above. A few more important critics of this doctrine which should be included here are Gordon Barnes, "The Paradoxes of Hylomorphism," *The Review of Metaphysics* 56 (2003), pp. 501-523; John Kronen, "The Substantial Unity of Material Substances according to John Poinsot," *Thomist* 58 (1994), pp. 599-615; Terence Nichols, "Aquinas's Concept of Substantial Form and Modern Science," *International Philosophical Quarterly* 36 (1996), pp. 303-318. On the other hand, a couple of the more recent defenders of this teaching include, Joseph Bobik, *Aquinas on Matter and Form and the Elements* (South Bend, IN: University of Notre Dame Press, 1998) and Fr. William Wallace, O.P., *The Modeling of Nature: Philosophy of Science and Philosophy of Nature in Synthesis* (Washington, D.C.: CUA Press, 1996).

[8] By this I mean beginning with our common experience of the world and consciously following the mode of procedure set out by Aristotle in *Physics*, Bk. 1, ch. 1. This will addressed in some detail in chapter three below.

[9] Such as the precise argumentative steps which St. Thomas lays out in his commentary on Aristotle's *Physics*, the accounts of first matter, substantial form and the privation of substantial form which St. Thomas carefully works out, the specific examples of accidental and substantial becoming which both Aristotle and St. Thomas use (which seem to be carefully designed to lead us from the more known to the less known), etc.

of St. Thomas's hylomorphism which *either*, explain and defend this doctrine "from the beginning,"[10] *or* enter into careful discussions regarding some of the more important details of St. Thomas's texts on these matters.[11] However, it is difficult to find works which do *both* of these things well.[12]

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[10] See, for example, Fr. Joseph Gredt, *Elementa Philosophiae Aristotelico-Thomisticae* (Barcelona, Spain: Editorial Herder, 1951), vols. 1 and 2; and Fr. Peter Hoenen, *Cosmologia* (Rome, Italy: Gregorian University Press, 1949). Both Frs. Gredt and Hoenen set forth various theses wherein they defend St. Thomas's hylomorphism quite well. Fr. Gredt is quite concerned with establishing the doctrine in general and defending it against contrary doctrines such as philosophical atomism, as is Fr. Hoenen. Fr. Hoenen's text is especially good on the defense of St. Thomas's hylomorphism in the context of the inorganic world. However, neither Fr. Gredt nor Fr. Hoenen provide their readers with many detailed discussions of the Aristotelian and Thomistic texts which undergird their positions. See also, Fr. Henry Koren, *An Introduction to the Philosophy of Nature* (Pittsburgh, PA: Duquesne University Press, 1962). Fr. Koren's text gives a quick and quite general defense of St. Thomas's hylomorphism and thereafter takes up and responds to some objections against it from modern science. As an introductory textbook, Fr. Koren's text does not delve into hardly any of the important primary texts regarding this doctrine. Lastly, see also, Fr. William Wallace, O.P., *The Modeling of Nature*. Fr. Wallace's book is almost exclusively concerned with showing that St. Thomas's hylomorphism and other doctrines which belong to natural philosophy ought to be considered as the more foundational truths about the natural world within the context of which we should understand the more empirical considerations of nature proper to modern science.

[11] For example, Joseph Bobik, *Aquinas on Matter and Form and the Elements*. In this text Bobik provides his reader with line by line commentaries on St. Thomas's *DPN* and *De mixtione*. After presenting these commentaries, Bobik then proceeds to argue that St. Thomas's doctrines on the principles of nature and the elements still have the utmost relevance for the contemporary understanding of the natural world. While Bobik's attention to textual detail is absolutely first rate and extremely illuminating, nonetheless, his book as such is not dedicated to providing a step by step defense of St. Thomas's hylomorphism. See also, Dennis Bonnette, *Aquinas' Proofs for God's Existence: St. Thomas Aquinas on the Per Accidens Necessarily Implies the Per Se* (The Hague: Martinus Nijhoff, 1972). This book gives a brilliant textual based explanation of *Physics*, Bk. 1, ch. 8. However, the aim of this text, as a whole, is to delineate the relationship between the *per se* and the *per accidens* and then to show how this relationship enters into a proper understanding of the *Quinque Viae*.

[12] Here, see Richard Connell, *Matter and Becoming* (Chicago, IL: The Priory Press, 1966). This is one of the best works, to my knowledge, which does both of these things well. This being said, it is also true that Connell leaves somewhat underdeveloped some important points, such as how a proper defense of the substantial unity of compound bodies must begin with those substances most known to us (i.e., ourselves). In addition, since Connell's text was penned more than forty years ago, it does not deal with some of the more contemporary objections against St. Thomas's doctrine. See also, Vincent Edward Smith, *The General Science of Nature* (Milwaukee, WI: Bruce Publishing Co., 1958). This text is also very good in terms of doing both of the things specified above. Smith spends about five chapters defending St. Thomas's hylomorphism as well as answering some of the more general objections leveled against it. Yet, since this book is just an introduction to the first part of natural philosophy, it lacks some of the attention to detail and specificity that a text solely dedicated to an explication and defense of St. Thomas's hylomorphism would have. Lastly, see, John of St. Thomas, *Cursus philosophicus Thomisticus*, ed. P. B. Reiser, 3 vols. (Turin: Marietti, 1930), vol. 2. This work is marvelous in terms of its attention to textual details. However, it is neither recent nor in English. This being said, John of St. Thomas's text will most certainly be used by the present author in order to develop an explication and defense of St. Thomas's teachings.

It seems, then, that a certain gap in the scholarly literature would be filled by a monograph-length work which aims at explicating and defending St. Thomas's hylomorphism (as the correct answer to the perennial question, *Quid sint principia naturae*?) both from the beginning and with careful discussions regarding some of the more important details of St. Thomas's texts on these matters. A secondary aim of this essay, then, will be to provide something of a filler for this gap in the scholarly literature.

With these points in mind, the present essay can be looked at as having three principal parts. First, in chapter one, we shall raise the question, *Quid sint principia naturae*?, explain what it involves, and delineate the requirements which must seemingly be satisfied by what would purport to be the correct answer. Second, in chapters two through seven, we shall attempt to show, both *per modum disputationis* and *per modum demonstrationis*, that St. Thomas's answer to this question is in fact true. Third and finally, in chapters eight and nine, we shall take up and attempt to answer some of the best contemporary objections against St. Thomas's answer to the question, *Quid sint principia naturae*?

In closing, I would like to give thanks to those who have helped me in bringing this work to its completion. Much gratitude is due to Dr. John F. X. Knasas, my director, for having been so patient with me over the past several years. His insightful corrections and suggestions, as well as his rapidity in returning drafts of my chapters, are all things which I hope to imitate with my own students. I thank as well, my readers, Dr. Christopher Martin and Dr. Thomas Osborne. By their helpful criticisms and suggestions, they have helped me both to think more deeply about the *principia naturae* and to make this essay more scholarly.

In addition, I am grateful both to the past Dean, Dr. Michael McLean, and to the present

Dean, Dr. Brian Kelly, of Thomas Aquinas College, for having allowed me to work on my dissertation in lieu of various other duties which normally occupy a tutor's summer time. I must also thank many of my colleagues and students at Thomas Aquinas College who, through both the spoken and written word, have profoundly helped me to better understand St. Thomas's hylomorphism.

Lastly, I must thank God, the Angelic Doctor, and my family. Were it not for God's causality, nothing in the created order would be. Were it not for St. Thomas's profound reflections on Aristotle's works and his luminous teachings on hylomorphism, his disciples' understanding of the *principia naturae* would be profoundly impoverished. Finally, were it not for the support of my eight children and my wife, this dissertation would never have reached completion. I thank my children for their love and patience. They have also provided me with many occasions to wonder about becoming, both accidental and substantial. I thank Jennaya, my wife, for her loving support and for her many sacrifices in helping me to finish this work. It is to her that I dedicate this dissertation.

June 27, 2011
Feast of Our Lady of Perpetual Help

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## Chapter One: *Quid sint principia naturae?*

The principal question with which we are concerned in this work – to wit, *Quid sint principia naturae*? – is one which naturally arises out of our experience of the world in which we live. Now, in this chapter, our chief aim is merely to locate and focus on what it is in our experience of the natural world which in some way stirs our minds to wonder about the very principles and causes of the natural things which are most known to us. However, before attempting this, a few words ought to be said regarding this rather ambiguous term, "experience," which we have already used twice.

### 1. The Origin of the Question

The term "experience" is often employed in common speech as a sort of shorthand for the term "sense experience" or "sense knowledge." A man might say, for example, when watching the sunset or when listening to Mozart, that he is "experiencing" the sunset or "experiencing" beautiful music. In a similar manner, someone would be speaking properly, if, when asked whether he likes the smell of freshly baked apple pie, he were to answer, "Yes, that is one of my favorite experiences." Now it seems, from these examples, that what is being signified by the term "experience" could also be signified, albeit perhaps in a more cumbersome way, by the terms "sense experience" or "sense knowledge." For the sunset is experienced or known through the sense of sight, the piece by Mozart is experienced or known through the sense of hearing, and the smell of the apple pie is experienced or known through the sense of smell.[1]

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[1] A further sign that the term "experience" is used in order to designate "sense knowledge" or "sense experience" is seen in the very etymology of the term. For the English word, "experience," seems to come from the Latin term *experientia* or *experimentum* and, before that, from the Greek term *ἐμπειρία*. These terms, in turn, seem to derive from the verbs *experior* and *ἐμπειράζω*, respectively. Now both of these verbs mean "to try" or "to test." Hence, it seems that, in terms of its origin, our English word "experience" is tied up with the notion of a "trial" or "test." Yet how do we most fundamentally "try" or "test" something? It seems that we do so precisely through our

But, in addition to this, the term "experience" can also name many sensible particulars which have been grasped through sense knowledge, remembered, and in some way brought together or collated.[2] For example, a seasoned parent may be able to make the judgement, from "experience," that his child is more likely to be moved to finish his math assignment in a timely fashion through the promise of a piece of candy than through the threat of some punishment. Now it is clear that such a judgement presupposes many particular dealings with the child which the parent both remembers and, in some way, brings together to form a whole. Hence, it seems right to say that if we are to have "experience," according to the second meaning of this term, we must first have many "experiences," according to the first meaning of the term given above.

Nevertheless, both meanings of this term still remain somewhat ambiguous. For, on the one hand, we might use this term "experience" in order to signify either a particular act of sense knowledge or many particular acts of sense knowledge which have been remembered and collated which every healthy adult human being has and cannot avoid having.[3] For example, no healthy adult

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sense knowledge of some given thing. For example, someone might "try" some food dish by tasting it in order to see if it needs any additional ingredients. Or, someone might "test" the bath water by touching it in order to see if it is the proper temperature.

With these things in mind, it seems that Stromberg is justified in maintaining that, "the word 'experience,' while a name for knowledge, is not taken in its more authentic uses to refer to just any kind of knowledge. Scientific knowledge of a thing, even though it is commonly admitted that such knowledge must be supported by experience and is in that sense experimental, is not itself experience. Experience seems rather to be associated with the beginnings of human knowledge; and so it is that the external senses and the knowledge proper to them are often referred to as 'experimental.'" James Stromberg, "An Essay on *Experimentum*," *Laval Theologique et Philosophique* 23 (1967), p. 76.

[2] Regarding this meaning of "experience," see *In Post. Ana.*, Bk. 2, *lectio* 20, vol. 1*2, p. 245 and *In Metaphys.*, Bk. 1, *lectio* 1, p. 9 (#15).

[3] When we refer to "sense experience" here we are not yet distinguishing between those things which are sensible *per se* (i.e., the proper and common sensibles) and those which are sensible only *per accidens* (e.g., this man). Rather, we are using the term "sense experience" here to refer to our knowledge of both kinds of sensible objects. The distinction between those things which are sensible *per se* and those which are sensible *per accidens*

human being can avoid knowing, thanks to his experience, that natural things exist. Similarly, it is evident to all healthy adult human beings that in the world there exist the kinds of beings which we call "living things." Also, we might say that every healthy adult human being knows that animals, or living things which are able to sense, actually exist.

Yet, on the other hand, we might use the term "experience" in order to signify either of these sorts of apprehensions of reality which need not be had by all healthy adult human beings. For example, one can be a perfectly healthy adult human being and yet be perfectly ignorant of the fact that the natural things which we call "sub-atomic particles" actually exist. Similarly, one can be a healthy adult human being and yet not know that the living things which we call "bacteria" exist. Also, it is not necessary for a healthy adult human being to have knowledge of the fact that there are such animals in the world as the duck-billed platypus.

It seems, then, that we ought to distinguish between these two kinds of "experience." Accordingly, let us use the term "common experience" in order to designate apprehensions of reality which every healthy adult human being has and cannot avoid having. Similarly, let us use the term "specialized experience" in order to designate various grasps of reality which need not be had by every healthy adult human being.[4]

Having made the distinction between common and specialized experience, we can now state more precisely what was said at the outset of this chapter. Our chief aim here is to locate and focus on what it is from our *common experience* of the natural world which in some way stirs our minds

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will be taken up later and more formally in chapter three.

[4] These definitions of "common experience" and "specialized experience" are taken from Michael Augros, "Reconciling Science with Natural Philosophy," *The Thomist* 68 (2004): p. 113.

to wonder about the very principles and causes of the natural things which are most known to us.[5]

What is it, then, from our common experience which in some what stirs our minds to wonder about the very principles and causes of the natural things which are most known to us? Put simply, the answer is *substantial becoming*. That is, it is from our common experience of reality that we see that the natural things which are most known to us are natural things of many different kinds which change into one another. To be more concrete, if we think of the living natural things which are most familiar to us, namely, men, brute animals, and plants, it is clear not only that they begin and end their lives *via* certain profound changes, but also that their lives are sustained thanks to the constant or almost constant transformations of other natural things into themselves. That is, Mr. Smith, this horse, and this oak tree only begin to be when certain other kinds of natural things (i.e., certain reproductive materials of various kinds) are somehow transformed into this man named "Mr. Smith," this horse, and this oak tree. Similarly, Mr. Smith, this horse, and this oak tree end their careers as natural things when they are changed into certain other kinds of natural things (i.e., the corpse of Mr. Smith, the remains of this horse, and the remains of this oak tree). Also, it is true to say that so long as Mr. Smith, this horse, and this oak tree remain alive, they are constantly or almost constantly changing other natural things of various kinds into themselves.[6] And since no healthy

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[5] It should be noted here that at this point we are deliberately not distinguishing in a clear and precise way between our "common experience" and our "common conceptions" which arise from our common experience of the natural world. This distinction will be treated to some extent in chapter three. Here it is sufficient to see that there is some difference between our common experience, as we have here defined it, and those things that we know from our common experience. The latter are known *via*, or thanks to, the former.

[6] It is also from our common experience that we see that familiar inanimate bodies are both transformed into other natural things which are well known to us and are produced through some of these other well known natural things being transformed into them. For example, when Mr. Smith consumes water and the water becomes part of his flesh and bones an inanimate body has been transformed into an animate body. When, on the other hand, Mr. Smith dies, he is transformed into either one or many inanimate bodies.

adult human being can avoid knowing these things, we see that it is from our common experience that we see that the natural things which are most known to us are natural things of many different kinds which are transformed into one another.

Now before we attempt to manifest how the reality of substantial becoming in some way stirs our minds to wonder about the principles and causes of natural things, let us first unpack what has just been stated. For, in maintaining that the natural things which are most known to us are natural things of many different kinds which change into one another, we are implicitly affirming three things.

First, we are affirming that the natural things which are most known to us (i.e., men, brute animals, plants, and various inanimate bodies) are many beings. Second, we are saying that these same natural things are of many really different natural kinds or species (i.e., men are different in kind from brutes, men and brutes are different in kind from plants, and all of these aforementioned living beings are different in kind from inanimate bodies). And, third, we are maintaining that these natural things which are most known to us somehow change into or are transformed into one another. Let us now examine in some detail each of these three things which we know or, at least, think that we know from our common experience of the natural world.[7]

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[7] It is clear that here there is an important underlying assumption, to wit, that every man, animal, and plant is a "natural" thing. That we consider every one of these beings a "natural" thing is clear from our speech about these things. Thus, the Philosopher says: "Of things which are, some are by nature and some through other causes. The animals and their parts and the plants and simple bodies, such as earth, fire, air, and water, are by nature. For we say these and such things are by nature" (*Physics*, Bk 2, Ch. 1, 192b8-12. Unless otherwise noted, all of the texts cited from the *Physics* are taken from the Coughlin translation, *id est*, Aristotle, *Physics, Or Natural Hearing*, trans. Glen Coughlin [South Bend, IN: St. Augustine's Press, 2005]). From what the Philosopher says here, we should note two things. First of all, the way we speak of nature reveals that we understand it to be a principle of sorts. For what comes to be by nature has nature as its principle, just as what comes to be by art has art as its principle. Second, the way we speak of nature reveals that we understand it to be not just any sort of principle, but rather to be an intrinsic principle. Thus, everyone thinks that what comes to be by nature "has a nature." It is important to note that the natural differs from the artificial on precisely this point. For while it is clear that a man, let us say, who comes to be by nature, himself has a nature, it is not the case that a statue, let us say, which comes to be by art, itself

## 2. Many Natural Beings

First, it seems clear to us, from our common experience, that in the world around us there exist many human beings, many brute animals, many plants, and many inanimate beings (e.g., earth, air, fire, water).[8] Furthermore, it seems clear to us that each of the many human beings which we encounter in the world is one being, simply speaking, or is what we commonly call an "individual"

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has an art. Rather, it is true to say that the art (i.e., the art in the mind of the sculptor of the statue) whereby the statue is formed and comes to be remains outside of the statue itself.

The term "nature," then, signifies an intrinsic principle. Hence, we should say that to name something a "natural" thing is to name the being in question from the way in which it is principled. In other words, every natural thing is a thing which has a nature within it. But what is this intrinsic principle an intrinsic principle of? The answer is: motion and rest. Now in order to see briefly what it means to say that nature is an intrinsic principle of motion and rest, let us return to our common experience of the natural world.

It is manifest from our experience that there are certain motions which belong to certain kinds of beings precisely as such. Thus, we observe both that the higher animals sense, move themselves from place to place, and so forth and that they perform these operations precisely as higher animals. Similarly, we see that living things precisely as living things grow up to the point of physical maturity and then stop growing. Also, we observe that heavy bodies qua heavy bodies (e.g., earth and water) are moved downwards whereas light bodies qua light bodies (e.g., air and fire) are moved upwards. Now it is not difficult to see that the acts of sensation and locomotion, which we find in the higher animals, have as their principle something within the higher animals themselves. We give the name "nature" to this principle. In a similar manner, we readily grasp the fact that growth to the point of physical maturity, which we observe in the case of living beings, is due to a principle within these living beings which we call their "nature." Likewise, in the case of the heavy and light bodies, we see that the former are principled in such a way that they are "naturally" moved downwards, whereas the latter are principled in such a way that they are "naturally" moved upwards. Hence, it seems clear that when we speak of higher animals, living things, heavy bodies, light bodies, and so forth as "natural things," we are understanding these beings to be ones which have within themselves principles of the motions which belong to them as such.

Adding to what has just been said, St. Thomas makes the following point: "Naturam...esse, est per se notum, inquantum naturalia sunt manifesta sensui. Sed quid sit uniuscuisque rei natura, vel quod principium motus, hoc non est manifestum" (*In Phys.*, Bk. 2, *lectio* 1, vol. 2, p. 57). We can say, then, returning to the beginning of our remarks here, that in holding that men, animals, plants, and various bodies are "natural" things, we are naming these beings from the way in which they are principled (i.e., they have within themselves principles of motion and rest), not because we know *what* these principles are in themselves, but rather because it is manifest to us (or *per se notum*, as St. Thomas puts it) *that* there are such principles in these beings which in some way account for the operations and motions which we observe to be proper to these beings in question.

[8] It should be noted that here we are only concerned with manifesting in a preliminary way the parts or aspects of our common experience listed above. In chapter four we shall have occasion to defend most of these same parts or aspects of our common experience in a more determinate way than will be done here.

(i.e., what is undivided in itself, but divided off from other things).[9] A sign of this is that, upon first hearing the use of the royal "we," children find it to be strange and even laughable. For it seems that children naturally see an incongruity when a human being speaks of himself as though he were a collection of many beings rather than just one being.

In addition, it seems manifest to us that each of the many brute animals with which we are relatively familiar (e.g., each horse, each dog, each cat, etc.) is a being. A sign that this is so can be seen in the fact that if someone is asked to point out some being (other than a man) which is unmistakably one, he will most likely point to some familiar brute animal such as his horse or dog.[10] Another sign that the unity of familiar brute animals is evident to us is seen in the fact that we often treat them in a way similar to the way that we treat human beings.[11] But, as was manifested, we

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[9] Regarding this St. Thomas says, "individuum...est quod est in se indistinctum, ab aliis vero distinctum" (*ST* I, q. 29, a. 4, vol. 4, p. 333). It is noteworthy that the meaning of "one" and of "individual" are not the same. Regarding this distinction, see *De veritate*, q. 1, a. 1, vol. 22, p. 5. For the purposes of this work, we are more interested in the unity of substances, than in their individuality. The reason for this will be specified in chapter four. At present we shall not distinguish sharply between natural beings qua undivided in themselves and natural beings qua undivided in themselves and divided off from other things.

[10] In his article, "Abstration from Matter," *Laval Theologique et Philosophique* 13 (1957): pp. 134-196, Charles De Koninck has the following to say: "It is noteworthy that, in choosing an instance of what is meant by an individual demonstrable to sense, we fix upon a man, or upon some familiar animal, like a horse, but not so readily upon a point on the blackboard, nor even a stone. The reason is that we have internal experience of numerical unity, exhibited in our sensations, in our conscious activities of thinking, doing and making, as belonging to one and the same self. Of the visible point on the blackboard we know that it is just particles of chalk; and of the stone, that while it may have the tangible and visible appearance of an individual like an individual man, it might still be many individuals. That a stone is an instance of individuality in some fashion is beyond doubt – there is nothing universal about this stone – but the individuality could be like that of a single crowd, or of an individual sun. We do not think this of a horse" (pp. 183-184). Here we cite this text only to help buttress the above claim that if asked to designate some being other than a man which is one without qualification, most people would naturally point to some familiar brute animal. Nevertheless, what De Koninck states here as the reason why we most readily fix our attention on men and familiar brutes when asked to demonstrate individuals (i.e., "we have internal experience of numerical unity, exhibited in our sensations, in our conscious activities of thinking, doing and making as belonging to one and the same self") is of great importance. Below, in chapter four, we shall discuss this point in some detail.

[11] As evidence for this, one might note both that we often name brute animals after the manner of our naming human beings and that we raise and discipline these animals in a way similar to the way in which we raise and discipline human beings. Further, the mistakes that many people make either in cherishing brute animals as though they were on the level of human children or in explicitly affirming that their brutes *are* persons just goes to

recognize every human being to be a being or individual.[12]

Now once we descend from a consideration of the many different brute animals, with which we are relatively familiar, to the many different plants that we find in the natural world, it becomes somewhat more difficult to designate the individual on a consistent basis and without recourse to specialized experience. Certainly in many cases we can readily identify the individual being at the plant level. It is relatively easy, for example, to see that this oak tree, or this maple tree, or this red wood tree is just one being. However, what about a pot of daisies? How many beings are before a person when he looks at a pot of daisies? In this sort of case, one might be unable to make a determinate judgement without digging up the plant(s) in question and examining the root structure(s). Yet perhaps such an investigation does not really go beyond what we know about the natural world thanks to our common experience.

By contrast, it seems decidedly more difficult for us to identify, with certitude, the individual being at the inanimate level. It is easy enough for us to point out "this rock" and to distinguish it from "that rock." Yet, is "this rock," which is being pointed out, one being or a collection of many beings which are very closely conjoined to one another? Likewise with a glass of water. As Michael

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show that there are many similarities between these animals and human persons. Nor are these mistakes restricted to modern times. Plutarch, for instance, relates the following account regarding Julius Caesar: "Caesar once, seeing some wealthy strangers at Rome, carrying up and down with them in their arms and bosoms young puppy-dogs and monkeys, embracing them and making much of them, took occasion not unnaturally to ask whether the women in their country were not used to bear children; by that prince-like reprimand gravely reflecting upon persons who spend and lavish upon brute beasts that affection and kindness which nature has implanted in us to be bestowed on those of our own kind." *Plutarch's Lives of Noble Grecians and Romans*, John Dryden, trans. (New York: The Modern Library, 1992), p. 201.

[12] Perhaps we can further appreciate the fact that each man is an individual by seeing that each man is a person. For a person is "rationalis naturae individua substantia" (*ST* I, q. 29, a. 1, vol. 4, p. 327). We see from this definition of the person that "individual" is said of person *per se* (more specifically, in the first mode of *per se*), since it enters into the very account or definition of person. Granted this, it is not difficult to see that the natural beings which are most obviously individuals are also those which are most obviously persons.

Augros says, "in the case of a glass of water, it is not terribly clear whether the glass contains one single substance, or a countless multitude of very tiny substances."[13] So too with a fire. Is the fire that is in one's fire place on a winter eve just one fire or many fires? In many such cases one cannot answer with certitude one way or the other. It seems, then, that, at least in many cases, we are unable to identify the individual inanimate being from the point of view of our common experience.[14]

Nonetheless, it does seem clear, with a little reasoning, that there must be some individuality at the inanimate level. In other words, even if we do not know for sure, from our common experience alone, whether this rock or this water or this fire be one or many, nonetheless, it does seem evident to us that either these things (i.e., this rock, this water, this fire) are themselves inanimate beings or these things are collections of inanimate beings, or these things are finally parts of some single inanimate thing.[15] Now whichever of these be the case, we can say that it is clear to us, from our common experience, that some individuality does exist at the inanimate level.[16]

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[13] Michael Augros, "Know Thyself," *The Aquinas Review* 6 (1999): p. 85.

[14] Regarding this point, Charles De Koninck says the following: "If we know how – at least in very many cases – to identify a living thing and to say that it is a substantial whole, ontologically distinct from its surroundings, one cannot say as much of the non-living. Is a rock a substantial being because it is in a certain way distinct from its surroundings? Is it spatial separation that provides the criterion? But what then of atoms? Is not man from the point of view of the physicist above all a void in which are scattered rare particles? Can I not sit down on two rocks at the same time and cannot two men ride one horse?

I know of no criterion that would show the ontological cuts of the inorganic world. I do not say either that such cuts do not exist: that would be an equally gratuitous assertion. I only say that I have no criterion to discern them. And I add that I see nothing more unfitting in an inorganic world, substantially one in which innumerable living things vegetate, than in one tree on which insects munch the same leaves," *The Writings of Charles De Koninck*, Vol. 1., Ralph McInerny, ed. and trans. (Notre Dame, IN: University of Notre Dame, 2008), p. 272.

[15] In the text quoted from De Koninck in the previous footnote, he mentions yet a third possibility. Perhaps the whole inanimate world is in fact just one big substance with many parts of different kinds (i.e., one big heterogenous substance).

[16] Here the phrase "from our common experience" is being used to indicate the *first*, but not *sole* source, of our judgement that there is individuality at the inanimate level.

## 3. Many Natural Kinds

Next, it seems that our common experience of the natural world is such that we take it for granted that the natural things with which we are most familiar (i.e., men, brute animals, plants, and various inanimate bodies) are of many really different natural kinds or species (i.e., men are different in kind from brutes, men and brutes are different in kind from plants, and all of these aforementioned living beings are different in kind from inanimate bodies). That this is manifest to us is made clear if we but examine the ways in which we distinguish these kinds of natural beings from one another. In other words, we say that the inanimate being is, but is not alive; the plant is alive, but is not sentient; the animal is sentient, but does not understand or reason; by contrast, man both understands and reasons in addition to being sentient, being alive, and simply being. Now since the differences which distinguish men, brutes, plants, and inanimate bodies from each other (i.e., rational and irrational, sentient and insentient, animate and inanimate, respectively) are not opposed to each other as more and less, but rather as being and not being or as having and lacking, it follows that there is a sort of infinite difference between what a man is and what a brute is, between what a brute is and what a plant is, and between what a plant is and what an inanimate body is.[17] Hence, it is clear that we think that the natural things with which we are most familiar (i.e., men, brute animals, plants, and various inanimate bodies) are of many really different natural kinds or species.

In addition to this, it seems evident to us that these different kinds of natural things just

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[17] This is not to deny, of course, that man and brute have a common proximate genus, or that plant and inanimate body share such a genus. Rather, it is to emphasize that the opposed differences which constitute the species man, brute, plant, and inanimate body are diverse from each other simply speaking. Regarding this point St. Thomas has the following to say: "simplicia non differunt aliquibus aliis differentiis, hoc enim compositorum est. Homo enim et equus differunt rationali et irrationali differentiis, quae quidem differentiae non differunt amplius ab invicem aliis differentiis. Unde, si fiat vis in verbo, non proprie dicuntur differre, sed diversa esse, nam, secundum philosophum X Metaphys., diversum absolute dicitur, sed omne differens aliquo differt" (*ST* I, q. 3, a. 8 *ad* 3, vol. 4, p. 48).

mentioned are ordered in an hierarchical manner. That is, we think that men are higher or more perfect than brute animals, brute animals are higher or more perfect than plants, and plants are higher or more perfect than inanimate bodies. For whenever one thing contains all of the perfection of another thing and more besides, we say that the former is higher or more perfect than the latter. Yet, this is the exact relationship which we encounter when we compare men to brutes, brutes to plants, and plants to inanimate bodies.[18]

## 4. The Reality of Substantial Becoming

Furthermore, our common experience of the natural world is such that we take it for granted that these essentially different natural things change into or are transformed into one another. But let us approach this by first attending to another sort of change or transformation that these same natural things undergo, but which is considerably less profound.

It is manifest to us from our common experience that beings, such as Mr. Smith, become such. By this we mean that Mr. Smith might become tan, or become fat, or become located in the marketplace. Now in all of these cases it is clear that one and the same being (i.e., Mr. Smith) underlies the becoming from beginning to end. That is, when Mr. Smith becomes tan, the being whom we name "Mr. Smith" changes from being pale to being tan. Similarly, when Mr. Smith

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[18] These points are made by Charles De Koninck in the following words:

"The ensemble of beings constituting nature is divided into four species: men, animals, plants, and the inorganic. One can know without understanding: animal; live without knowing: plant; be without living: inorganic. These four species are the only ones philosophically definable. The canine species is not a species in the philosophical sense.

Natural species thus constitute a hierarchy. The plant is manifestly more perfect than the rock or a nebula (abstracting from the life it may contain), being at once corporeal and vegetative. The animal is at once sensitive, vegetative, and corporeal; to which man adds rationality. We say that these species are essentially different. One lives or one does not, one can know or one cannot. There is no intermediary." *The Writings of Charles De Koninck*, p. 258.

becomes fat, it is the being whom we name "Mr. Smith" that transitions from being thin to being fat. Lastly, when Mr. Smith becomes located in the marketplace, it is the very same being that changes from being somewhere else to being located in the marketplace.[19]

Now the reality of this sort of becoming leads us to see quite clearly the distinction between "substance" and "accidents." In other words, when we see a being such as Mr. Smith becoming tan (i.e., changing from being pale to being tan), we recognize that Mr. Smith himself is distinct both from his tanness (since he was not always tan) and from his paleness (since he is no longer pale). Hence, we see that as far as Mr. Smith himself is concerned (i.e, insofar as he is this being), his tanness and paleness are characteristics which befall him or happen to him. Of course, something similar becomes apparent, if we think of Mr. Smith becoming fat and ceasing to be thin or if we think of him becoming located in the marketplace and ceasing to be somewhere else. That is, upon observing a being, such as Mr. Smith, becoming fat and thus ceasing to be thin, we clearly see that both Mr. Smith's present girth and past thinness befall him or happen to him qua Mr. Smith. In a similar manner, when Mr. Smith becomes located in the marketplace and thus ceases to be somewhere else, we readily recognize that both Mr. Smith's present location and his past location are attributes which truly belong to him, but not precisely insofar as he is Mr. Smith. Hence, we

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[19] One might wonder why these examples of becoming have been used here. The reason is that, as we learn from Aristotle and St. Thomas, becoming *per se* occurs only in the categories of quality, quantity and place (see, e.g., *In Phys.*, Bk. 5, *lectio* 2, vol. 2, pp. 232-233). As a result, becoming is found in the other accidental categories only *per accidens*. And this seems right, if one considers the matter inductively. For example, we can say that "Mr. Smith has become taller than his father" and "taller than" certainly should be brought under the category of relation in some way. Nonetheless, no one can doubt that the becoming involved here is really one of growth or becoming in the category of quantity. Properly speaking, Mr. Smith has increased in his magnitude and through this increase in his magnitude, there is a change of how Mr. Smith is quantitatively related to his father. Hence, in this case, the becoming is *per se* in the category of quantity and *per accidens* in the category of relation.

Now a further point, which is not difficult to see, is that the becoming and the ceasing to be of an individual being, such as Mr. Smith, go hand in hand. In other words, when Mr. Smith becomes tan, he ceases to be pale. When he becomes fat, he ceases to be thin. And when Mr. Smith becomes located in the marketplace, he ceases to be outside of the marketplace.

should say that both Mr. Smith's being in the marketplace and his location outside of the marketplace befall him or happen to him qua Mr. Smith.

Of course, what is common to these three cases of coming to be and ceasing to be in a certain respect is that there is a being (i.e., Mr. Smith) who is observed to have certain attributes or characteristics befall or happen to him qua himself. More specifically, Mr. Smith's attributes or characteristics, which we are here considering, are in Mr. Smith as in a subject. However, Mr. Smith himself is not in anything as in a subject. That is, it is clearly false to think that Mr. Smith is in some subject the way in which his various attributes or characteristics are in him. In other words, Mr. Smith does not depend for his being (i.e., for his being the man which he indeed is) on some subject the way in which his attributes or characteristics depend on him for their being.

Now, for the sake of clarity and brevity, let us assign the term "substance" to any being, such as Mr. Smith.[20] Similarly, let us assign the term "accidents" to any attributes or characteristics which

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[20] When we consider a being, such as Mr. Smith, we should note both that such a being is a subsistent thing and that such a being is complete in the nature of its species. These are the two essential parts in the fuller definition of *hoc aliquid* or "this something" according to St. Thomas. Thus, St. Thomas says, "hoc aliquid potest accipi dupliciter: uno modo, pro quocumque subsistente: alio modo, pro subsistente completo in natura alicuius speciei. Primo modo, excludit inhaerentiam accidentis et formae materialis: secundo modo, excludit etiam imperfectionem partis. Unde manus posset dici hoc aliquid primo modo, sed non secundo modo" (*ST* I, q.75, a. 2 *ad* 1*um*, vol. 5, p. 196). Given this, we can say that Mr. Smith's hand or his head is, in a sense, a "substance." For each of these parts is subsistent. However, neither of these parts of Mr. Smith is a "substance" in the fuller sense of the term, since neither of these parts is complete in the nature of some species.

Further, St. Thomas notes that both the metaphysician and the physicist treat of natural or sensible substance. They do so, however, differently. For the metaphysician treats of natural substances not insofar as they are natural substances, but insofar as they are substances or beings or insofar as through them we can be led by the hand to a knowledge of immaterial substances. Regarding the physicist's treatment of natural substance, St. Thomas says, "Physicus vero e converso determinat de substantiis materialibus, non inquantum sunt substantiae, sed inquantum materiales et habentes in se principium motus." *In Metaphys.*, Bk. 7, *lectio* 11, p. 446 (#1526). In the course of this essay we shall endeavor, as much as possible, to proportion our examination of natural substance and its principles and causes to the science of natural philosophy. There will be times, however, when we shall have to consider these same matters from a more metaphysical vantage point.

befall or happen to a substance and, thus, are in the substance as in a subject.[21] Speaking precisely, then, we might say that through seeing the changes which Mr. Smith undergoes, we come to appreciate that while his tanness, his fatness, and his location in the marketplace certainly belong to Mr. Smith, these same "beings"[22] are not part of Mr. Smith's substance.[23] Rather, Mr. Smith's color, his girth, and his location are, strictly speaking, accidents or "beings" which befall or happen to his substance and which, in so doing, are in his substance as in a subject.

Having distinguished, then, "substance" and "accidents,"[24] we may now also distinguish

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[21] Since substance is something subsistent and since accidents are not subsistent, one can see that the division of being into substance and accident is based on the opposition of contradiction. Hence, St. Thomas says, "si accidens accipiatur secundum quod dividitur contra substantiam, sic nihil potest esse medium inter substantiam et accidens: quia dividuntur secundum affirmationem et negationem, scilicet secundum esse in subiecto et non esse in subjecto" (*ST* I, q. 77, a. 1 *ad 5um*, vol. 5, p. 237).

[22] The term "beings" is put in quotes since here it is being used in one of its extended senses. That is, the term "being" is said first and simply of substance and only secondarily and in a certain respect of accidents. A sign that this is the case can be seen in the fact that if a man is asked to point out a "being," he will undoubtedly first point to a substance, such as a man or a horse, or perhaps to something made out of many substances, such as a chair or a table. No one, when asked to point out a "being," first of all designates the shape or color of something. On this point the following text from the Angelic Doctor is insightful: "...dicendum quod in his quae ex opposito dividuntur, quaedam inveniuntur quae sunt naturaliter simul et secundum rem, et secundum rationem, sicut duae species animalis, vel duae species coloris. Quaedam vero sunt simul secundum rationem, sed unum realiter est prius altero et causa eius, sicut patet in speciebus numerorum, figurarum et motuum. Quaedam vero non sunt simul nec secundum rem, nec secundum rationem, sicut substantia et accidens, nam substantia realiter est causa accidentis; et ens secundum rationem prius attribuitur substantiae quam accidenti, quia accidenti non attribuitur nisi inquantum est in substantia." *ST* I-II, q. 29, a. 2 *ad 1um*, vol. 6, p. 204.

[23] One might wonder if what we have established here is true for certain other attributes and characteristics of Mr. Smith such as his power of understanding or his masculinity. Both of these are traditionally considered to be accidents (see, e.g., *De anima*, q. 12, *ad 7um*, vol. 24, 1, p. 111), yet we cannot separate either of these from Mr. Smith and still have him before us. What, then, of accidents such as these?

Despite the permanence of these sorts of attributes or characteristics (unlike their separable counterparts considered above), the power of understanding, masculinity, and other things of this sort are still "beings" which must be in something or someone as in a subject, if they are to be at all. Hence, the power of understanding, masculinity, and other things of this sort are truly accidents (i.e., in the predicamental sense of "accident"). On the other hand, the being in whom they are, as in a subject (e.g., Mr. Smith), is a substance. For a more precise treatment of the definitions of substance and accident than we can provide here, see *Quod.*, IX, q. 3, a. un. *ad 2um*, vol. 25, 1, p. 99.

[24] Lord Bertand Russell has the following to say regarding substance: "'Substance,' when taken seriously, is a concept impossible to free from difficulties. A substance is supposed to be the subject of properties, and to be something distinct from its properties. But when we take away the properties, and try to imagine the substance by

"accidental becoming" and "substantial becoming." The former simply signifies that change whereby a substance acquires a new accident of one sort or another (e.g., Mr. Smith becoming tan, becoming fat, or becoming located in the marketplace). The latter, on the other hand, signifies the change or transformation of this substance into that (entirely new) substance.

The examples of substantial becoming mentioned above are helpful here as well. That is, when certain human reproductive materials become Mr. Smith, it is true to say that certain substances have been transformed into an entirely new substance, namely, Mr. Smith. Likewise, when certain equine reproductive materials become this horse, we can say that certain substances have changed into an entirely new substance, namely, this horse. Also, when this acorn becomes this oak tree, again, it is true to maintain that this substance has been transformed into this other entirely new substance. Of course, we must say similar things when Mr. Smith, this horse, and this oak tree become the substances which we call "the corpse of Mr. Smith," "the remains of this horse," and "the remains of this oak tree." Again, whenever Mr. Smith, this horse, and this oak tree consume some other substances and transform these substances into themselves, it is true to say that the

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itself, we find that there is nothing left. To put the matter in another way: What distinguishes one substance from another? Not difference of properties, for, according to the logic of substance, difference of properties presupposes numerical diversity between the substances concerned. Two substances, therefore, must be *just* two, without being, in themselves, in any way distinguishable. How, then, are we ever to find out that they *are* two?

"'Substance,' in fact, is merely a convenient way of collecting events into bundles. What can we know about Mr. Smith? When we look at him, we see a pattern of colours; when we listen to him talking, we hear a series of sounds. We believe that, like us, he has thoughts and feelings. But what is Mr. Smith apart from all these occurrences? A mere imaginary hook, from which the occurrences are supposed to hang. They have in fact no need of a hook, any more than the earth needs an elephant to rest upon. Any one can see, in the analogous case of a geographical region, that such a word as 'France' (say) is only a linguistic convenience, and that there is not a *thing* called 'France' over and above its various parts. The same holds of 'Mr. Smith'; it is a collective name for a number of occurrences. If we take it as anything more, it denotes something completely unknowable, and therefore not needed for the expression of what we know.

"'Substance,' in a word, is a metaphysical mistake, due to transference to the world-structure of the structure of sentences composed of a subject and a predicate." *A History of Western Philosophy* (New York: Simon and Schuster, 1945), pp. 201-202.

Here Lord Russell has provided us with a great summary of the Humean understanding of substance. In chapter four, amongst other things, we shall undertake a refutation of this attack on the reality of substance.

substances which have been consumed have been changed into the substances which are Mr. Smith, this horse, and this oak tree.[25]

Now granted the distinction between accidental and substantial becoming, we might wonder how these two kinds of becoming are related. Is one kind of becoming naturally before the other? We should keep in mind here that above we distinguished three kinds of accidental becoming, to wit, qualitative becoming, quantitative becoming, and becoming as regards place. How do these three kinds of accidental becoming relate to substantial becoming? It seems that if we are attentive to our common experience, we can answer these questions without too much difficulty.

In order to do so, let us consider what is required in order for a man, or a horse, or an oak tree to grow or increase in size.[26] Let us begin with the man. If a man, such as Mr. Smith, is to grow, he must eat. But what is first of all involved in eating is moving the food from outside of oneself to inside oneself. Thus, in eating his steak, Mr. Smith moves the steak from being on his plate to being in his mouth. Now after the steak is in Mr. Smith, as in a place, it undergoes many qualitative changes so as to prepare the steak to become part of Mr. Smith. Once the steak has undergone enough qualitative changes so as to prepare it to become one in being with Mr. Smith, the steak ceases to be the substance which it was and comes to be part of the very substance of Mr. Smith. Now the change of the steak into Mr. Smith makes possible Mr. Smith's growth or increase in size. Hence, we notice that, other things being equal, the size of Mr. Smith's waist will grow in proportion

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[25] At this point it is easy to see that just as becoming and ceasing to be go hand in hand in the order of accidents, so too do they go hand in hand in the order of substance. Thus, when the substances which we are here calling "certain human reproductive materials" become the substance that is Mr. Smith, the former substances cease to be. Likewise, when Mr. Smith becomes a corpse, Mr. Smith ceases to be. Also, when Mr. Smith eats an apple, the substance which is the apple ceases to be. And so on for the other cases just mentioned.

[26] Here "to grow" and "to increase in size" are used with the same meaning in mind.

to the number of steaks he eats.

Now it is not difficult to see that something similar to this ordered process must occur, if either a horse or an oak tree is to grow or increase in size. That is, if either a horse or an oak tree is to grow, first it must take some food into itself. Thereafter, the horse or the oak tree must alter its food and, then, transform the food into its very substance. This change of the food into the substance of the horse or oak tree, in turn, makes possible the growth of the horse or of the oak tree.

Hence, from our brief analysis of what is presupposed to the growth of a living being, we can see that there is a certain natural order amongst the kinds of becoming. For becoming as regards place can be without qualitative becoming, yet the latter cannot be without the former. Similarly, qualitative becoming can be without substantial becoming, yet the latter cannot be without the former. And, finally, substantial becoming can be without quantitative becoming (in the sense of growth or increase in size), but the latter cannot be without the former. Thus, we see that becoming as regards place is what we might characterize as the first and most basic of all kinds of becoming. Further, it seems safe to say that qualitative becoming is a certain way to or road to substantial becoming. And lastly, perhaps it is quite clear that substantial becoming is presupposed to every case of quantitative becoming (in the sense of growth or increase in size).[27]

Looking back now over the ground that has been covered, so far all we have done is elucidate three things which we implicitly affirm when, based on our common experience of the natural world, we make the judgement that substantial becoming is a reality. First, we manifested that the natural things which are most known to us (i.e., men, brute animals, plants, and various inanimate bodies)

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[27] St. Thomas seems to agree that this is the order found amongst the various kinds of coming to be. See, for example, *In Phys.*, Bk. 8, *lectio* 14, vol. 2, p. 417.

are many substances. Second, we made clear that these same natural substances are of many really different natural kinds or species (i.e., men are different in kind from brutes, men and brutes are different in kind from plants, and all of these aforementioned living beings are different in kind from inanimate bodies). And, third, we illustrated the fact that these natural substances which are most known to us somehow change into or are transformed into one another.

## 5. Wondering about the *Principia Naturae*

At this point it remains for us to show how the reality of substantial becoming in some way stirs our minds to wonder about the principles and causes of the natural substances which are most known to us. What is it about substantial becoming which stirs us to want to know what the principles and causes of the natural substances which are most known to us actually are? Perhaps the following text from Fr. William H. Kane, O.P. gives us the beginnings of an answer to this question:

> From the dawn of consciousness we have been aware that there is a reality whose existence is immediately evident to us through our senses. It is a reality that is various and changing in appearance. Indeed, it is known to us ultimately because it changes, and we ourselves change in the knowing of it, and to our knowledge of it we respond with love and hate, with joy and sorrow, with hope and fear. It is a reality that excites our admiration and wonder. If we are scientifically inclined, we are curious to learn more about it by accurate observation and experiment; if philosophically inclined, we ask the awful question: What is it?
>
> What is this reality which undergoes sensible change? We call it the sensible world because its beauty and order can be observed by the senses. We call it the physical world because it is subject to sensible motion. We call it the corporeal world because it is extended and has parts, part outside of part. But what kind of being is this whose parts come sensibly into being and sensibly cease to be? What is its very essence? Of what is it made?
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> This is the question which gave birth to all philosophy and experimental science. It is a question which has engaged the minds of philosophers from the time of Thales to the present day; and justly so, because the changing sensible world is the

first reality to challenge human reason.[28]

Clearly Fr. Kane is here attempting to help us wonder about the very principles and causes of the natural substances which are most known to us. In order to further this attempt, we shall attend here, first generally and thereafter more specifically, to the way in which what we learn from our common experience of substantial becoming causes us to wonder about the principles and causes of these same natural substances.[29] First and most generally, then, we can put the three aforementioned things which are affirmed in our judgement that substantial becoming happens to the natural

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[28] William H. Kane, O.P. "Hylemorphism and the Recent Views of the Constitution of Matter," *Proceedings from the American Catholic Philosophical Association* (1936): pp. 61-74.

[29] The claim here is not that what follows is the *only* way of bringing together and thinking about these things known from our common experience so as to stir the mind to wonder about the principles of natural things. Indeed, it seems reasonable to hold (although we shall not argue for this here) that there are two principal ways of stirring the human mind to wonder about these principles. The first of these, which proceeds chiefly through a consideration of substantial becoming, is the one which we are here attempting to delineate in a somewhat brief manner.

Now the second principal way of moving the mind to wonder about the principles of natural things seems to be through a consideration of the oneness and the manyness of the beings which constitute the natural world. To flesh this out a bit, we can consider how all men are both one and many. They are in some sense one in nature, yet they are many distinct individuals. Of course, something similar must be said regarding all horses, all oak trees, all rocks and so forth. Now thinking about all of these really different kinds of beings (i.e., all men, all horses, all oak trees, all rocks, etc.), we can see that they are all both one and many in some sense. That is, all of these beings are one insofar as they are all natural things, yet they are also many distinct individuals of many really different kinds. But how can these beings be both one and many at the same time? The answer is that there must be something in the very nature or constitution of natural things as such which explains or accounts for this oneness and manyness which we encounter in the natural things in the world around us. However, since we do not readily see the principles which explain this oneness and manyness of these natural things, we are led to wonder about the nature of the principles and are, thus, led to ask: What are the principles thanks to which natural things are both one and many at the same time? What causes within the natural things themselves explain both the oneness and the manyness of these same natural things? Or, to put the same essential query in slightly different terms, *Quid sint principia naturae*?

Now it does not seem to be by accident (another claim for which we shall not argue here) that these two principal ways of stirring the human mind to wonder about the nature or essence of natural things are also what some understand to be the two principal ways of discovering the natures of the principles or intrinsic causes of natural things (i.e., *via* substantial becoming and *via* the existence of many individuals which have the same nature or which belong to the same species). However, we shall delay a discussion of this particular point to a more opportune setting (i.e., chapter six).

On these matters see, Fr. Peter Hoenen, S. J., *The Philosophical Nature of Physical Bodies* (West Baden Springs, IN: West Baden College, 1955), pp. 3-19, as well as Fr. Joseph Owens, "The Aristotelian Argument for the Material Principle of Bodies," in *Aristotle: The Collected Papers of Joseph Owens*, ed. John R. Catan (Albany, NY: State University of New York Press), pp. 122-135.

substances most known to us somewhat more formally, so as to say that, thanks to our common experience of the natural world, we readily see that at some time or other we can truthfully say of every one of the natural substances which are most know to us: *this substance of this kind becomes that substance of that kind.* But if this substance of this kind becomes that substance of that kind, there must be some principles or causes in these substances themselves owing to which the change or transformation of this substance of this kind into that substance of that kind is explained. In other words, since, as St. Thomas says, "it is necessary that every new thing have some cause,"[30] when we observe that this substance of this kind becomes that substance of that kind, it must be the case that there are principles or causes in these natural substances themselves which account for this change or transformation. Thus, we are led to ask, what are these principles or causes? Or, *Quid sint principia naturae*?[31] In asking this question, we are attempting to see the principles and causes which account for (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself.

Secondly and more specifically, we can come to appreciate how what we come to know from our common experience of substantial becoming causes us to wonder about the principles and causes of the natural substances which are most known to us, if we but reflect on the reality of substantial

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[30] "...omne novum oportet quod habeat aliquam causam...," *SCG.*, Bk. 3, ch. 89, vol. 14, p. 273.

[31] This question can be taken to mean both, "Quid sint principia generationis?" (insofar as "natura" can name the generation of a living thing), and, "Quid sint principia rerum naturalium?" (insofar as "principia naturae" can be shorthand for "principia rerum naturalium"). It is by intention that we are not distinguishing these two questions when we ask, *Quid sint principia naturae*? Cf. Joseph Bobik's *Aquinas on Matter and Form and the Elements* (Notre Dame, IN; University of Notre Dame Press, 1998), p. 14. *Contra* Bobik, St. Thomas does sometimes use the name "principia naturae" to mean "principia rerum naturalium." See, for example, *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45 and Bk. 2, *lectio* 1, vol. 2, p. 56.

becoming in light of something that St. Thomas says about change in general. In his *De potentia*, St. Thomas makes the following observation: "by the name 'change' and 'transition' the same thing is signified as having itself differently now and before."[32] Another way to put this is to say that we cannot conceive of a change without conceiving of something which underlies the change from beginning to end (i.e., something which undergoes the change or something which changes). But every case in which this substance of this kind becomes that substance of that kind is a change. Hence, we cannot conceive of this substance of this kind becoming that substance of that kind without conceiving of something which underlies the substantial becoming from beginning to end (i.e., something which undergoes the substantial becoming or something that becomes that substance of that kind).[33] In other words, our very understanding of substantial becoming involves the notion that there is some underlying stuff (i.e., some matter or some material principle) which becomes the new substance at which the substantial becoming terminates. To be more concrete, our understanding of the nature of substantial becoming is such that we hold that there is some matter which becomes or is transformed into Mr. Smith, or this horse, or this oak tree when any of these substances comes to be. Yet, what is this matter? What is it that becomes or is transformed into the substances which are familiar to us from our common experience of the natural world? Or, to put

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[32] "In nomine enim mutationis et transitus designatur aliquid idem aliter se habere nunc et prius." *De potentia*, q. 3, a.2, vol. 2, p. 41.

[33] St. Thomas seems to be getting at this, at least implicitly, when he says, "considerandum est quod generatio importat aliquid commune, quod est incipere esse; et etiam importat determinatum modum essendi, scilicet per transformationem." *In de Caelo*, Bk. 1, *lectio* 24, vol. 3, p. 97. Also, it should be clear that when we say that substantial becoming, or any becoming, is unintelligible without something underlying the becoming, we are seeing the truth of the principle, *ex nihilo nihil fit secundum naturam*. Regarding this principle, see *De potentia*, q. 3, a .1 *ad* 1*um*, vol. 2, p. 39, *In Metaphys*., Bk. 12, *lectio* 2, pp. 687-688 (#s 2432-2433 and 2437-2438) , and Boethius's *De consolatione philosophiae*, Bk. 5, ch. 1. Further, although the principle *ex nihilo nihil fit secundum naturam* is known through itself, in chapter six we shall attempt to show how we come to see the truth of this principle through induction.

it another way, what is it that stands to substantial becoming as some substance such as Mr. Smith stands to accidental becoming (e.g., when Mr. Smith changes from being pale to being tan)?

At this point we can only say two things that this matter is not. First, and most obviously, we can say that this matter is not the substance which comes to be. For example, the matter that becomes Mr. Smith, or this horse, or this oak tree cannot be Mr. Smith, or this horse, or this oak tree. For these substances do not exist prior to the end of the substantial becoming whereby they come to be. For they are the very termini of their respective substantial becomings. But the matter which becomes Mr. Smith, or this horse, or this oak tree does exist prior to the end of the substantial becoming whereby they come to be. For, as was said above, this matter is that which underlies the substantial becoming from beginning to end. Thus, it is plain that the matter which becomes Mr. Smith, or this horse, or this oak tree cannot be Mr. Smith, or this horse, or this oak tree. Or, to put it universally, the matter which underlies substantial becoming is not the substance which comes to be.

Second, the matter in substantial becoming cannot be the substance(s) which is/are commonly observed to change into the new substance which comes to be. For example, the various reproductive materials which are commonly observed to change into some substance such as Mr. Smith, or this horse, or this oak tree cannot themselves be what underlies the substantial becoming of Mr. Smith, or this horse, or this oak tree. For the substances just mentioned do not exist at the end of their respective becomings. For these substances cease to be as the new substances, which they become, come to be. But the matter in substantial becoming is present at the end of the becoming. For, as was pointed out above, the matter in substantial becoming is what underlies substantial becoming from beginning to end. Hence, the various reproductive materials which are

commonly observed to change into some substance such as Mr. Smith, or this horse, or this oak tree cannot themselves be the matter which underlies the becoming whereby Mr. Smith, or this horse, or this oak tree come to be. Or, put generally, the matter in substantial becoming cannot be the substance(s) which is/are commonly observed to change into the new substance which comes to be.

Knowing, then, to a certain extent what the matter in substantial becoming is not, we are left to wonder what it is. What is its nature? Now in wondering about this, it should be clear that we are actually desiring to know the nature of a principle or cause of the natural substances which are most known to us.[34] For whatever this matter is, it is something on which these natural substances depend both in order to come to be and in order to remain in being.

Thus, from our common experience of the reality of substantial becoming, we see *that* there is some principle or cause which becomes the natural substances of many different kinds with which we are readily familiar (i.e., men, brute animals, plants, and various inanimate things). However, our common experience by itself is not sufficient to reveal to our minds precisely what this principle or cause is that becomes these same many natural substances. Indeed, our common experience does

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[34] The following text from St. Thomas seems pertinent here: "Obiectum...intellectus est quod quid est, idest essentia rei, ut dicitur in III De anima. Unde intantum procedit perfectio intellectus, inquantum cognoscit essentiam alicuius rei. Si ergo intellectus aliquis cognoscat essentiam alicuius effectus, per quam non possit cognosci essentia causae, ut scilicet sciatur de causa quid est; non dicitur intellectus attingere ad causam simpliciter, quamvis per effectum cognoscere possit de causa an sit. Et ideo remanet naturaliter homini desiderium cum cognoscit effectum, et scit eum habere causam, ut etiam sciat de causa quid est. Et illud desiderium est admirationis, et causat inquisitionem, ut dicitur in principio Metaphys. Puta si aliquis cognoscens eclipsim solis, considerat quod ex aliqua causa procedit, de qua, quia nescit quid sit, admiratur, et admirando inquirit. Nec ista inquisitio quiescit quousque perveniat ad cognoscendum essentiam causae" (*ST* I-II, q. 3, a. 8, vol. 6, pp. 35-36). From this text it becomes clear that we are naturally stirred to wonder about something, if we see that it has a cause without seeing what the cause is in itself. Hence, a man wonders about the nature of an eclipse and asks, "What is an eclipse?" once he sees an eclipse (and appreciates that it is an effect), but before he sees what its cause(s) is/are. In a similar way, we are attempting to point out here that we are led to wonder about the natures of the principles of natural things and, thus, are led to ask the question, *Quid sint principia naturae*?, once we see that natural things come to be from some principle(s) (and, therein, appreciate that natural things are effects of the principle[s] from which they come to be), but before we see what the principle(s) or cause(s) is/are.

not even clearly reveal to us whether this principle or cause is one or many. Is there only one principle or cause which underlies substantial becoming or are there many principles and causes which underlie substantial becoming? Hence, once more, we are led to ask the question, *Quid sint principia naturae?*[35] Furthermore, in asking this question, what we desire to see is precisely how the principle(s) and cause(s) in question account(s) for (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself.

It is clear, then, both generally and specifically how, from our common experience of substantial becoming, we come to wonder about the *principia naturae*. Now before we begin to look at how some before us have attempted to answer the question, *Quid sit principia naturae*? (which task shall occupy us in chapter two), it seems worthwhile to state briefly what we naturally expect such an answer to provide us with, intellectually speaking.

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[35] Speaking principally about beginning the science of natural philosophy, Fr. Melvin Glutz puts well some of the points which I am attempting to express here. He writes:

"The material subject of natural philosophy is all sensible and material being, the whole world upon which our senses feed. What will our formal subject be? To establish it we must find some common aspect of all sensible beings, some characteristic in which they all share, which will serve to unify material being and to furnish a key whereby we can penetrate to the general nature of it. For this common characteristic must needs be a property of material being as such, and by this property we will be able to define the nature of the sensible world on the most general level. Whatever common property we find will be a wedge whereby we pry open the shell of physical being and get our first look at the nature crouching within.

"What is this common aspect? To find it was no difficulty for Aristotle, nor need it be for us. The one facet of reality that had puzzled philosophers from the beginning is that all things are changing, or are in motion. The mark of change is unmistakeably evident in all sensible things. 'We physicists,' says Aristotle, 'must take for granted that the things that exist by nature are, either all of some or them, in motion – which is indeed made plain by induction.' Notice that he does not say absolutely 'all of them,' but leaves open the possibility that there may be some beings unknown to us that do not change...

"Note that we do not mean any kind of motion without restriction.... We can take into consideration only motions that flow from an intrinsic principle, motions that we qualify as 'natural.'" So the typical operations of animals, plants and simple elementary bodies are evidently natural, as issuing from a commensurate interior principle.... It is natural motions in which we are interested, those that flow from a nature or intrinsic principle." Taken from his, *The Manner of Demonstrating in Natural Philosophy* (River Forest, IL: Studium Generale of St. Thomas Aquinas, 1956), pp. 48-49.

Since this question arises out of our wonder at the fact that the natural substances which are most known to us are substances of many different kinds which change into one another (or, that at some time or other we can truthfully say of each of the natural substances which are most know to us: *this substance of this kind becomes that substance of that kind*) and since, as was shown above, this judgement implies our grasp of three things, it seems only fitting that the true answer to this question would provide us with at least three things, intellectually speaking. That is, it seems that the true answer to the question, *Quid sit principia naturae*?, must account for or provide an explanation for the three aforesaid things which we know thanks to our common experience, namely, (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself. Now, as we examine some of the answers that our predecessors have given to this question, we shall have to gauge how well or how poorly their respective answers satisfy the wonder which originally gave rise to the very question which they are attempting to answer.

## 6. Résumé

The aim of this chapter was to locate and focus on the things known from our common experience of the natural world which cause us to wonder about the *principia naturae* of the natural things which are most known to us. We maintained that it is thanks to our knowledge of substantial becoming or of this substance of this kind becoming that substance of that kind that we are led to inquire into the natures of the *principia naturae*. After giving some preliminary evidence which suggests that we know the natural things which are most familiar to us to be individual substances of many really different kinds which change into one another (and, in so doing, distinguishing

between substance and accident and between substantial becoming and accidental becoming), we set forth two ways in which we are moved by the reality of substantial becoming to ask the question, *Quid sint principia naturae*? Lastly, we argued that we can reasonably expect the true answer to this question to provide us with an account of (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself.

## Chapter Two: Some Ancient and Modern Attempts at an Answer

Having seen that we are moved by certain things which we know from our common experience of the natural world to ask the question, *Quid sint principia naturae*?, we must next endeavor to satisfy our wonder by answering this question. In this chapter we shall undertake the beginnings of such an endeavor. More specifically, we shall presently examine five attempts to answer the question, *Quid sint principia naturae*?, with an eye to seeing whether any of these answers comport with the various things known from our common experience which originally gave birth to this question. The first four answers which we shall examine here are provided by some of the ancient natural philosophers,[1] while the fifth answer comes from some modern physicists. All five of these answers have in common the fact that they are the result of an attempt to think and speak about the principles of natural things "naturally."[2]

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[1] In what follows we shall be assuming that Aristotle's understanding of the various Presocratic views on the *principia naturae* is correct. This, however, is not agreed on by scholars. Two works which argue that Aristotle's understanding of the Presocratics was more or less flawed are Harold Cherniss, *Aristotle's Criticism of Presocratic Philosophy* (Baltimore: Johns Hopkins Press, 1935) and Michael Stokes, *One and Many in Presocratic Philosophy* (Washington, D.C.: Center for Hellenic Studies, 1971).

Even if Aristotle's understanding of what the Presocratics hold to could be shown to be incorrect, this would not undermine the substance of our argument here. For here we are primarily concerned with seeing that the four Presocratic positions exhaust the ways of answering the question, *Quid sint principia naturae*?, if one conceives of the material cause(s) in becoming as some substance(s). We are only secondarily interested in these answers as the first answers, historically speaking, which were given to this question.

[2] As he introduces his eighth *lectio* on Book One of the *Physics*, St. Thomas writes as follows: "Postquam Philosophus improbavit opinionem de principiis [naturae] eorum qui de natura non naturaliter sunt locuti, hic prosequitur opiniones eorum qui de principiis naturae naturaliter sunt locuti, non removentes motum: et ideo vocat eos physicos, idest naturales" (*In Phys.*, Bk. 1, *lectio* 8, vol. 2, p. 24). What this text makes clear, at least implicitly, is that finally there are two ways in which one can speak of the principles of nature, to wit, "non naturaliter" or "naturaliter." If one speaks about the principles of nature "non naturaliter," then one essentially denies that there are such things as natural things, since one denies or removes the existence of change as well as the reality of multiplicity. Such, of course, is the position of Parmenides and Melissus, both of whom maintain that being is one and immobile. On the other hand, if one speaks about the principles of nature "naturaliter," then whatever one posits to be the principles of nature must in some way comport with the reality or existence of both multiplicity and change. Or, to put it another way, those who speak "naturaliter" about the principles of nature are thinkers whose answer to the question, *Quid sint principia naturae*?, is one which does not deny altogether that there are such things as natural things. In this essay we are only concerned with examining the positions of those thinkers who speak "naturaliter" about the principles of nature. We leave it to the metaphysician to deal with the positions of thinkers such as

Now perhaps an appropriate way to introduce the first four of these answers (i.e., those provided by the ancient natural philosophers) would be to look at what Aristotle says at the outset of the second chapter of Book One of the *Physics*. For there, after having shown, in the first chapter, that the student of nature ought to begin his study of the natural world by treating of the principles of natural things most generally or universally, Aristotle writes:

> But it is necessary that there be one principle or many, and if one, either immobile, as Parmenides and Melissus say, or moving, as the students of nature say, some saying the first principle is air, some, water. But if many, either they are finite {limited} or infinite {unlimited}, and if finite but more than one, either two or three or four or some other number; and if infinite, either, as Democritus says, one in kind {genus} but differing in shape or else differing in species or even contraries.[3]

The reason why this text serves as an appropriate way to introduce the first four answers to the question, *Quid sint principia naturae*?, is that it reveals how these four answers are opposed to each other and, hence, distinct from each other. If we set aside the view shared by Parmenides, Melissus, and others – which maintains that being is one and immobile (and, thus, that there are no natural things) – then it is clear that Aristotle is presenting us here with four different views on the principles of nature and, therefore, with four different answers to the question, *Quid sint principia naturae*?

Generally speaking, the first view says that there is one principle of nature and that it is mobile or subject to change. The second view holds that the principles of nature are many, but finite in number. By contrast, the third view maintains that the principles of nature are infinite in number, yet all of the same kind. Lastly, the fourth view states that the principles of nature are infinite in number, but of different kinds. It is not difficult to see that this list of views on the principles of

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Parmenides, Melissus, *et alii huiusmodi.*

[3] *Physics*, Bk. 1, chapter 2, 184b15-21.

nature is in some way exhaustive. For either one posits one principle or many principles. If the latter, either the principles are finite in number or infinite in number. If the latter, either the infinite number of principles are all principles of the same kind or they are of different kinds.

## 1. The Answers of Thales and Empedocles

Now the first answer to the question, *Quid sint principia naturae*?, which we shall examine here was given in a particular way by the ancient natural philosopher Thales. Thales, of course, holds to the first view listed above, insofar as he maintains that water is the one mobile principle of nature from which all things come to be. Perhaps the following fragment describes Thales's position well:

> For moist natural substance, since it is easily formed into each different thing, is accustomed to undergo very various changes: that part of it which is exhaled is made into air, and the finest part is kindled from air into aither, while when water is compacted and changes into slime it becomes earth. Therefore Thales declared that water, of the four elements, was the most active, as it were, as a cause (*KRS*, 87).[4]

From this text not only do we see that Thales maintains water to be that from which all things come to be, but we also see something of the "mechanism" whereby he thinks this occurs. That is, Thales seems to think that when water rarefies it becomes air and ether, whereas when it condenses it becomes mud and earth. Hence, Thales accounts for the coming to be and the ceasing to be of the other elements through the rarefaction or the condensation of water, the element of the elements.[5]

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[4] This text from Heraclitus Homericus, *Quaest. Hom.* 22 was quoted from G.S. Kirk, J.E. Raven, and M. Scholfield, *The Presocratic Philosophers* (Cambridge: Cambridge University Press, 1983), p. 92. For a more recent translation of some of the fragments of the Presocratics, see Robin Waterfield, *The First Philosophers: The Presocratics and Sophists* (Oxford: Oxford University Press, 2000).

[5] It is well known that the ancient natural philosophers took the elements or simple bodies in the natural world to be fire, air, earth, and water. Following Aristotle, St. Thomas holds that there are three things which characterize the elements as such. First, the elements are the first bodies from which other bodies are composed.

Now since all mixed bodies, such as men, horses, oak trees and so forth, come to be from the elements, and since all of the elements other than water come to be from the rarefaction and condensation of water, it follows that all mixed bodies, such as men, horses, oak trees and so forth finally come to be from nothing other than the rarefaction and condensation of water. In other words, it seems that, according to Thales, whenever this substance of this kind becomes that substance of that kind, what is truly occurring is water is either being rarified or condensed.[6] So, in answer to the question, *Quid sint principia naturae*?, Thales's essential response is, *water*.

Why did Thales hold to this position? That is, what would move someone to think that the principle of natural things is nothing other than so much water? Perhaps to a certain extent we can account for Thales's position with the following line of reasoning: first, we see that the natural substances with which we are most familiar (i.e., men, brute animals, plants, various inanimate bodies such as fire, air, earth, and water) form a kind of hierarchy, going from the more complex to the less complex. Next, it seems evident to us that we should understand more complex substances by resolving them to their least complex or most basic component parts. As a result, it seems that we should look for that natural substance in our experience which both (a) is the least complex or most basic and (b) most of all enters into the constitution of the more complex or less

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Second, the elements remain in some way in the bodies which are composed from them. Third, the elements are indivisible according to their species (i.e., the elements cannot be divided into more basic kinds of bodies although they may be divided up into smaller parts of the same kind of thing). See, for example, *DPN*, ch. 3, vol. 43, p. 43. This account of what an element is seems to be in accord with Thales's general understanding of an element, as is clear from the above text. However, it is perhaps worth noting that, given this understanding of what an element is, we should say that, as far as Thales is concerned, there is really only one element, namely, water. On this view, the other bodies which the ancients commonly considered to be elements would not be elements in the strict sense. For in reality, says Thales, these other "elements" are finally rarified or condensed water.

[6] Hence, it seems true to say that, according to Thales, everything in the natural world is either rarified water, condensed water, or water in a kind of middle state (i.e., just plain water).

basic natural substances.

But it seems somewhat reasonable to say that water is the natural substance which we are looking for. For, as Thales indicates, there seems to be some evidence in our sense experience for thinking that water is the natural substance which (a) is the least complex or most basic. That is, as Thales points out, it seems to be the case that at least some of the other elements can be formed from either the rarefaction or condensation of water. If this is so, then, perhaps there is some justification for thinking that water is the element of elements.

Further if we look to what St. Thomas says, then there seem to be four signs that water (b) most of all enters into the constitution of the more complex or less basic natural substances. Commenting on what Aristotle says regarding Thales's position in the first book of the *Metaphysics*, St. Thomas writes:

> [Thales] used three signs in order to show that water is the principle of the being of things. The first sign is that the food which living things consume must be moist. But what living things are nourished by is the same as that from which they are. Thus, the moist seems to be the principle of [their] being. The second sign is that the being of every bodily thing, and most of the being of living things, is preserved through their proper and natural heat. But heat seems to come to be from what is moist, since the moist itself is, as it were, the matter of heat. Hence, from this it seems that the moist is the principle of the being of things. The third sign is that the life of the animal consists in the moist. Whence, on account of the drying up of its natural moistness the animal dies and through the preservation [of its natural moistness] the animal is sustained. But with living things to live is to be. Hence, from this it is again clear that the moist is the principle of the being of things. Furthermore, these three signs follow from each other. For the animal is nourished by the moist since its natural heat is sustained by the moist; and from these two it follows that the life of the animal is always because of the moist. But that from which something comes to be, that is, that from which the being of something results, is the principle of all the things which have their being from that thing. And on account of this he [i.e., Thales] maintains this position that the moist is the principle

of all things.[7]

Now after stating these things, St. Thomas mentions a fourth sign and then explicitly links up "the moist" with "water." He writes:

> And similarly he [i.e., Thales] takes a sign from the generation of things. For the generations of living things, which are the most noble of beings, come to be from seeds. But the seeds or the sperm of all living things have a moist nature. Whence, from this it is again clear that the moist is the principle of the generation of things. But if it be added to all of the aforementioned things [i.e., to all of the aforementioned arguments from signs] that water is the principle of moistness, then it follows that water is the first principle of things.[8]

From these four signs it seems clear that there is some reason for thinking that water (b) most of all enters into the constitution of the more complex or less basic natural substances. Hence, since there is some reason for thinking that water both (a) is the least complex or most basic natural substance and (b) most of all enters into the constitution of the more complex or less basic natural substances, there seems to be some plausibility to the position advocated by Thales. Thus, there is some reason to think that whenever this substance of this kind becomes that substance of that kind, what is truly occurring is water is either being rarified or condensed.

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[7] ...utebatur tribus signis ad ostendendum aquam esse principium essendi rebus: quorum primum est, quia nutrimentum viventium oportet esse humidum. Ex eodem autem viventia nutriuntur et sunt; et sic humor videtur esse principium essendi. Secundum signum est, quia esse cuiuslibet rei corporeae, et maxime viventis, per proprium et naturalem calorem conservatur: calor autem ex humore fieri videtur, cum ipse humor sit quasi caloris materia: unde ex hoc videtur quod humor sit rebus principium essendi. Tertium signum est, quia vita animalis in humido consistit. Unde propter desiccationem naturalis humidi, animal moritur, et per eius conservationem, animal sustentatur. Vivere autem viventibus est esse. Unde ex hoc etiam patet quod humor sit rebus principium essendi. Et haec etiam tria signa seinvicem consequuntur. Ideo enim animal humido nutritur, quia calor naturalis humido sustentatur; et ex his duobus sequitur, quod vivere animalis sit semper per humidum. Id autem ex quo aliquid fit, idest ex quo aliquid esse consequitur, est principium omnibus quae ex illo esse habent. Et propter hoc accepit hanc opinionem quod humor esset omnibus principium. *In Metaphys.*, Bk. 1, *lectio* 4, pp. 28-29 (#80).

[8] Similiter etiam accepit signum ex rerum generatione, quia generationes viventium, quae sunt nobilissima in entibus, fiunt ex seminibus. Semina autem sive spermata omnium viventium habent humidam naturam. Unde ex hoc etiam apparet, quod humor est generationis rerum principium. Si autem omnibus praedictis coniungatur quod aqua est humiditatis principium, sequitur quod aqua sit primum rerum principium. *In Metaphys.*, Bk. 1, *lectio* 4, p. 29 (#81).

Now in contrast to the position of Thales, the second view which we shall here examine – namely, that of Empedocles – maintains that all four of the elements (i.e., earth, air, fire, and water) stand together as equally basic principles of nature. In other words, according to Empedocles, the principles of nature are many, yet finite in number (or, more precisely, four in number). Here are a few of the fragments which explain his position:

> Hear first the four roots of all things: shining Zeus, life-bringing Hera, Aidoneus and Nestis who with her tears waters mortal springs (*KRS*, 346).[9]
>
> Another thing will I tell you: of all mortal things none has birth, not any end in accursed death, but only a mingling and interchange of what is mingled – birth is the name given to these by men (*KRS*, 350).[10]
>
> And when they [*sc.* the roots] are mixed in the form of a man and come to the air, or in the form of the race of wild beasts or of plants or of birds, then they say that this comes into being; but when they are separated, they call this wretched fate: they do not name them as is right, but I myself comply with custom (*KRS*, 351).[11]
>
> Fools – for they have no far-reaching thoughts, since they think that what before did not exist comes into being, or that a thing dies and is completely destroyed (*KRS*, 352).[12]
>
> For it is impossible for anything to come to be from what is not, and it cannot be brought about or heard of that what is should be utterly destroyed; for wherever one may ever set it, there indeed it will always be (*KRS*, 353).[13]

From this text several points regarding Empedocles's position become manifest. First, unlike Thales, it is clear that Empedocles does not maintain that there is one element to which the other

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[9] Fragment 6, Aetius, 1, 3, 20, taken from G.S. Kirk, J.E. Raven, and M. Scholfield, *op. cit.*, p. 286.

[10] Fragment 8, Plutarch *adv. Colotem* 1111F, *Ibid.*, p. 291.

[11] Fragment 9, Plutarch *adv. Colotem* 1113A-B, *Ibid.*, p. 291.

[12] Fragment 11, Plutarch *adv. Colotem* 1113C, *Ibid.*, pp. 291-292.

[13] Fragment 12, [Aristotle] *M.X.G.* 2, 975b1, *Ibid.*, p.. 292.

three elements may be reduced in some way. Rather, perhaps having been struck by the differences in properties found in earth, air, fire, and water, Empedocles holds that all four of the elements are first principles from which all natural things both come to be and are.

Second, whereas Thales posits the rarefaction and condensation of water as the two basic ways of altering water and, thus, as the two basic ways of explaining the coming to be of all natural substances, it seems true to say that Empedocles accounts for the coming to be of all natural things through the combination and separation of earth, air, fire, and water. In other words, according to Empedocles, when the four elements are combined in the proper proportion, then a man, let us say, comes to be. When, however, these same four elements are sufficiently separated, the corpse of a man comes to be. Of course, something similar could be said regarding the coming to be of a horse, an oak tree, or any other natural substance, holds Empedocles. In other words, according to Empedocles, whenever we think that the many different kinds of natural substances which are most known to us are changing into one another, what is really happening is this: the four elements are either combining or separating. Hence, it seems that in answer to the question, *Quid sint principia naturae*?, Empedocles answers, *earth, air, fire, and water*.

Third, it is clear to Empedocles that his view regarding the principles of nature implies that there are no such things as birth or death (i.e., substantial becoming). For, as we saw above, he maintains that birth and death or substantial becoming are nothing more than names which men give to certain changes which, in reality, are only cases of accidental becoming. In other words, the position of Empedocles amounts to saying that men are deceived insofar as they think that there is such a thing as substantial becoming in the natural world around them.

Furthermore, Empedocles gives us the reason why he thinks that substantial becoming cannot

be. As we saw above, he states, "For it is impossible for anything to come to be from what is not, and it cannot be brought about or heard of that what is should be utterly destroyed; wherever one may ever set it, there indeed it will always be." In the initial part of this statement, Empedocles seems to be reminding us of the fact that from our common experience of the natural world we come to see that every becoming has something which underlies it.[14] But, in addition, Empedocles seems to be claiming that if we grant that every becoming has something which underlies it, then we must deny that there is substantial becoming. Why so? Perhaps we might put the answer this way: Let it be that every becoming has something which underlies it. Yet, what is the underlying principle or material principle in substantial becoming, if not some natural substance(s) found in the world around us? But, if the material principle in substantial becoming is some substance(s) found in the world around us, then what we supposed to be substantial becoming is really only accidental becoming and not truly substantial becoming. Hence, it seems as though the principle, "every becoming has something which underlies it," rules out the very possibility of substantial becoming.

Put in syllogistic form, Empedocles's argument might be stated as follows: every becoming in which the material principle is some substance(s) is an instance of accidental becoming.[15] But the principle, "every becoming has something which underlies it," requires that every supposed case of substantial becoming in the natural world be one wherein the material principle is some substance(s). Hence, the principle, "every becoming has something which underlies it," requires that every supposed case of substantial becoming in the natural world be an instance of accidental becoming.

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[14] This is a positive way of formulating the principle *ex nihilo nihil fit secundum naturam.* Another positive way to render this principle is to say, "in every becoming there is something which becomes." Or, as St. Thomas puts it, "omne quod fit, fit ex ente." See, *In Metaphys.*, Bk. 11, *lectio* 6, p. 636 (#2227).

[15] The truth of this premise is apparent from the discussion of substantial and accidental becoming which was taken up in the first chapter.

But we can be more specific than this still concerning Empedocles's position. For, as he says above, concerning the ceasing to be of natural substances, "wherever one may ever set it, there indeed it will always be." Here Empedocles seems to be saying that the elements cannot be destroyed, but only moved from one place to another. Now if Marcus Berquist is correct, then the only kind of change which Empedocles finally accepts is change of place. Beginning with some general comments about Empedocles' position, Berquist says the following:

> ...Empedocles will go on to say that there is no such thing as birth and death. There is no such thing as coming to be and passing away. There is nothing really substantially new under the sun. There's only the mixing and un-mixing of things that eternally exist. Furthermore, there's no alteration. Things never get any hotter, never get any colder. Why? Because fire is hot, and water is cold. If fire could make water hot, it could act upon water, could make water cease to be water. But water must always be, because it is the first principle. So whenever you feel something hot, what you're feeling is the heat of the fire that's in it, not a heat that's been communicated to that thing. If you draw out the consequences of this view, then, there's no change of substance, there's no change of quality, and there's no growth. Because growth similarly requires a change of substance. All there is is moving around.[16]

While this understanding of Empedocles's position goes beyond his own words cited above, nonetheless, it certainly comports with and even seems to be implied by Empedocles's expressed position. That is, we have just seen that Empedocles denies the reality of substantial becoming, and this on pain of violating the principle that every becoming has something which underlies it. Yet, as we observed in chapter one, qualitative change is a certain road to substantial becoming, while quantitative change presupposes substantial becoming. As a result, it seems right to say that to deny the possibility of substantial becoming is finally to deny the possibility of every kind of change other than change of place. Thus, for Empedocles, "all there is is moving around."

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[16] Marcus Berquist, "Where Philosophers Disagree," *Lectio* (1994): p. 28.

## 2. The Answers of Democritus and Anaxagoras

Now the third position vis-à-vis the principles of nature, which we shall here examine, maintains that the principles of nature are infinitely many, yet all of the same kind. Democritus, of course, is one thinker who is well known for holding to this position. The following texts state the essence of the Democritean position:

> Leucippus and his associate Democritus hold that the elements are the full and the void; they call them what is and what is not respectively. What is is full and solid, what is not is void and rare. Since the void exists no less than body, it follows that what is not exists no less than what is. The two together are the material causes of existing things (*KRS*, 555).[17]

> They [sc. Leucippus, Democritus, Epicurus] said that the first principles were infinite in number, and thought they were indivisible atoms and impassible owing to their compactness, and without any void in them; divisibility comes about because of the void in compound bodies (*KRS*, 557).[18]

> ...these atoms move in the infinite void, separate one from the other and differing in shapes, sizes, position and arrangement; overtaking each other they collide, and some are shaken away in any chance direction, while others, becoming intertwined one with another according to their congruity of their shapes, sizes, positions and arrangements, stay together and so effect the coming into being of compound bodies (*KRS*, 584).[19]

> Democritus sometimes does away with what appears to the senses, and says that none of these appears according to truth but only according to opinion: the truth in real things is that there are atoms and void. 'By convention sweet', he says, 'by convention bitter, by convention hot, by convention cold, by convention colour: but in reality atoms and void (*KRS*, 549).'[20]

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[17] Aristotle, *Met.* A4, 985b4 (DK 67A6), taken from G.S. Kirk, J.E. Raven, and M. Scholfield, *op. cit.*, p. 414.

[18] Simplicius *de caelo* 242, 18 (DK 67A14), *Ibid.*, p. 414.

[19] Simplicius *de caelo* 242, 21, *Ibid.*, p. 426.

[20] Fragment 9, Sextus *adv. math.* 7, 135, *Ibid.*, p. 410.

There seem to be several things which we should take note of here regarding Democritus's position. To begin, Democritus maintains that both atoms and void are the first principles from which all natural substances are made. Or, to put it another way, both being and non-being are the "things" from which natural substances come to be. However, from these texts alone, it is not altogether clear why Democritus maintains this position. Be that as it may, the following text from Epicurus does help to supply something of an account for Democritus's position. Epicurus writes:

> ...the whole of being consists of bodies and space. For the existence of bodies is everywhere attested by sense itself, and it is upon sensation that reason must rely when it attempts to infer the unknown from the known. And if there were no space (which we call also void and place and intangible nature), bodies would have nothing in which to be and through which to move, as they are plainly seen to move. Beyond bodies and space there is nothing which by mental apprehension or on its analogy we can conceive to exist. When we speak of bodies and space, both are regarded as wholes or separate things, not as the properties or accidents of separate things.
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> Again, of bodies some are composite, others the elements of which these composite bodies are made. These elements are indivisible and unchangeable, and necessarily so, if things are not all to be destroyed and pass into non-existence, but are to be strong enough to endure when the composite bodies are broken up, because they possess a solid nature and are incapable of being anywhere or anyhow dissolved. It follows that the first beginnings must be indivisible, corporal entities.[21]

Epicurus begins by maintaining that it is evident to us from sense that bodies exist. And from the existence of bodies, Epicurus reasons to the existence of void. That is, if there were no void, bodies would be nowhere and locomotion would be impossible. But it is evident that bodies are somewhere and that they do in fact move from place to place. Hence, Epicurus concludes that there must be void.

Further, Epicurus notes that we know that some bodies are compounds. It is clear from our common experience, for example, that men, horses, and oak trees are mixed bodies or compound

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[21] Diogenes Laertius, *The Lives of Eminent Philosophers*, Vol. 2, R. D. Hicks, trans. (Cambridge, MA: Harvard University Press, 1965), Bk. 10, 40-41, pp. 569-571.

bodies as opposed to simple bodies. But if there are compound bodies (and there are), then there must be simple bodies which compose them or make them up. Hence, simple bodies exist. Now according to Epicurus and Democritus, these simple bodies are nothing other than atoms.

Next, Epicurus argues that the simple bodies or atoms must be indivisible and unalterable. The argument which Epicurus provides us with for this conclusion seems to come to this: if the atoms were corruptible as are the compound bodies which the atoms make up, then after the destruction of a compound body, nothing would remain. But after the destruction of compound bodies, some things always seem to remain.[22] Hence, these remaining simple bodies (i.e., the atoms) must themselves be incorruptible and, hence, indivisible and unalterable.[23]

Returning then to Democritus's position itself, we can say that both the atoms and the void present within a compound body are thought to explain various attributes which belong to the latter. Thus, Democritus tells us that compound bodies are divisible thanks to the void that is present within them. It would seem reasonable to conclude, in addition, that compound bodies are light or heavy depending on whether they have a lot or a little void within them.

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[22] By way of example one might think of the burning down of an oak tree. After an oak tree has been destroyed by fire, it is evident that there remain certain things such as ashes. Epicurus takes this to be a sign that the materials out of which the oak tree was formerly composed (i.e., the atoms) are not themselves corruptible.

[23] It is worth noting the similarity between this argument used here by Epicurus and the following argument given by Lucretius: "...Nature dissolves all things into their atoms; things can't die back down to nothing. For if things could die, atoms and all, then death would snatch them away before our very eyes. No need then for a force to split them apart or to unravel the knitting-together of atoms. But since all is made of everlasting seeds, until some force meets a thing head-on and shatters it, or penetrates the spaces between the atoms and loosens their ties, nature allows no death. Besides, whatever old age clears away, were time to consume its matter and kill it completely, how could Venus lead the animals, kind by kind, to the light of life, or how could the artful earth feed them with food for their kinds and cause them to grow? Out of what would the inner springs and the distant rivers sustain the sea? Or the heavens pasture the stars? Anything made out of destructible matter infinite time would have devoured before. But if the atoms that make and replenish the world have endured through the immense span of the past their natures are immortal – that is clear. Never can things revert to nothingness." *De rerum natura* (Bk. 1, lines 215-235), Anthony Esolen, ed. and trans. (Baltimore, MD: The Johns Hopkins University Press, 1995), p. 31

On the other hand, Democritus holds that the flavors, the tangible qualities of hot and cold, and color which we attribute to compound bodies are not truly found in the compound bodies themselves. In other words, according to Democritus, all of these sensible qualities only are "by convention," and this because they are not really in the atoms which make up the compound bodies. Thus, to Democritus's mind, our common experience is to a great extent illusory

It is not difficult to see that, according to the Democritean account of things, we must maintain with Empedocles that the only sort of becoming that there is in the natural world is coming to be in this place or in that place. In other words, according to Democritus, the only sort of change that really is, is the moving around of an infinite number of atoms in the infinitely expansive void. Through the combination and separation of these atoms, Democritus attempts to explain the coming to be of the compound bodies in the natural world around us. Hence, according to Democritus, the coming to be of a man, or a horse, or an oak tree consists in nothing other than a certain relocating and combining of many atoms. As a result, a man, or a horse, or an oak tree, while it exists, is essentially a combination of atoms with void present therein. According to Democritus, therefore, whenever this substance of this kind becomes that substance of that kind, what is truly occurring is atoms are being combined or separated in various ways. We can see, then, the way in which Democritus generally answers the question, *Quid sint principia naturae*? That is, for Democritus, the principles of nature are nothing other than *an infinite number of atoms and an infinite void.*

The fourth and final ancient view concerning the principles of nature which we shall examine here comes from Anaxagoras. Like Democritus, Anaxagoras holds that the principles of nature are infinite in number. Yet, unlike Democritus, Anaxagoras thinks that these principles differ in kind. The following texts describe what is essential to Anaxagoras's position:

> ...we must suppose that there are many things of all sorts in everything that is being aggregated, seeds of all things with all sorts of shapes and colours and tastes...(*KRS*, 483)[24]

> How could hair come from what is not hair or flesh from what is not flesh (*KRS*, 484)?[25]

> ...all things have a portion of everything. Since it is not possible that there should be a smallest part, nothing can be put apart not come-to-be all by itself, but as things were originally, so they must be now too, all together. In all things there are many ingredients, equal in number in the greater and in the smaller of the things that are being separated off (*KRS*, 481).[26]

As noted above, Anaxagoras agrees with Democritus on the number of principles of nature, yet disagrees with him regarding their kinds. While Democritus holds that the infinite number of principles of nature are one in kind, Anaxagoras holds that they are many in kind. Furthermore, Anaxagoras seems to hint at the reason why he thinks this must be so. As we saw, he asks, "How could hair come from what is not hair or flesh from what is not flesh?" Perhaps what Anaxagoras is pointing out here is that hair, flesh, and other such seemingly homogeneous natural substances are really different in kind. Certainly this seems true enough from our everyday experience. Yet if these and many other seemingly simple natural substances are really different in kind from one other, how, we might ask, can principles of the same kind (e.g., Democritus' atoms) be called on to explain these essential differences? Anaxagoras seems to think that to posit principles of just one kind is effectively to deny that there are real differences between the natural substances in the world around

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[24] Fragment 4, Simplicius *in Phys.* 34, 29, taken from G.S. Kirk, J.E. Raven, and M. Scholfield, *op. cit.*, p. 369.

[25] Fragment 10, scholion *in* Gregor. Naz. 36, 911 Migne, *Ibid.*, p. 369.

[26] Fragment 6, Simplicius *Phys.* 164, 26, *Ibid.*, p. 366.

us.[27]

Indeed, it is interesting to note that on this point Democritus seems to agree with Anaxagoras. For, as we saw above, Democritus does not claim to have truly explained such differences with the principles of nature which he posits. Rather, Democritus readily admits that if the principles of nature which he posits are in fact the true principles, then there are no different kinds of natural substances. In truth, to think otherwise would be to confuse what is by convention with what is really by nature, says Democritus. Anaxagoras, on the other hand, seems to think that such a consequence is a sign that Democritus, and perhaps others, do not have a hold on the true principles of nature.

Now even though Anaxagoras disagrees both with Democritus regarding how many kinds of principles of nature there are and with Empedocles regarding how many principles of nature there are, nonetheless, he agrees with both of these thinkers concerning what they understand to be the true nature of birth and death, or the true nature of substantial becoming. That is, all three of these philosophers maintain that the supposed substantial becoming whereby a man, or a horse, or an oak tree comes to be consists in nothing other than the combining or separating of many already existing substances. In other words, according to these thinkers, whenever the many different kinds of natural substances which are most known to us change into one another, what is truly occurring is that certain already existing substances are merely being relocated. Hence, for all three of these

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[27] For a anti-reductionistic reading of Anaxagoras, see Daniel Graham, "Was Anaxagoras a Reductionist?," *Ancient Philosophy* 24 (2004), pp. 1-18. Graham writes: "A radical pluralist, Anaxagoras seeks not theoretical simplification but robust realism, not hierarchical stratification but ontological leveling. The fact that he belongs to the same metaphysical camp as Empedocles and the atomists—a camp we might call Eleatic pluralism (a term made popular by Wardy 1988)—makes it tempting to interpret Anaxagoras as belonging to the same methodological camp as well—the camp of reductionism," *Ibid.*, p. 17. Hence, in calling Anaxagoras's position here a kind of *Pluralism*, we do not mean to deny certain essential differences between it and the positions of both Empedocles and Democritus.

philosophers, all there is finally is moving around.

The answer, then, that Anaxagoras gives to the question, *Quid sint principia naturae*?, is the following: *an infinite number of infinitely small particles of every homogeneous substance*. Thus, according to Anaxagoras, these same particles underlie both "the substantial becoming" whereby a man comes to be and "the substantial becoming" whereby a rock comes to be. But we name one of these things, "a man," and the other, "a rock," because of the particular kinds of particles which are most manifest in each compound.

To a certain extent, then, we have seen why Anaxagoras was forced, as it were, by his experience of the natural world to posit principles of many really different kinds. Yet why does he think that the principles of nature must not only be of many really different kinds, but also that these principles must be infinite in number and infinitely small? So far, our examination of Anaxagoras's position has not revealed the answer to this question. We should note, though, that this very question seems to be one which St. Thomas has in mind in his *lectiones* on the first book of Aristotle's *Physics*. Speaking to this question, St. Thomas says the following:

> If something comes to be, it is necessary that it come to be either from being or from non-being. But he [i.e., Anaxagoras] excluded one of these, namely that something could come to be from non-being, on account of the common opinion of the philosophers stated above. Whence, he concluded the remaining option, namely that something comes to be from being. So, for example, if air comes to be from water, it must be that the water existed beforehand. But he could not say that air came to be from water unless the air pre-existed in the water. Hence, he was willing to accept that everything which comes to be from another was pre-existing in that from which it came to be. But since this seems contrary to what appears to sense (for it is not apparent to sense that what is generated from another pre-exists in that other thing), he answers this by maintaining that what comes to be from another pre-exists in the other thing according to some smallest parts, which cannot be sensed by us on account of their smallness. So, for example, if air comes to be from water, some smallest parts of air are in the water, but not in that quantity in which it is generated. And, therefore, through the congregation of those parts of air to each other and

> through the separation from the parts of water, he said air comes to be. Thus, having maintained this, that everything which comes to be from something pre-exists in it, he further assumed that everything comes to be from everything. Hence, he concluded that everything is mixed in everything according to its smallest and insensible parts. And since one thing is able to come to be from another infinitely, he said that there are an infinite number of smallest parts [of each thing] in each thing.[28]

From this text of St. Thomas we see that Anaxagoras holds his position to be the only account of what we name "substantial becoming" which comports both with the real differences in kind amongst the homogeneous substances which are relocated in the natural world, and with the principle that every becoming has something which underlies it. In other words, because Anaxagoras thinks that, given the right circumstances, everything can become everything and, therefore, that everything must be in everything (lest the principle, every becoming has something which underlies it, be violated), he is forced to maintain that each and every thing which we identify as a natural substance (e.g., each and every man, horse, oak tree, and so forth) is in reality nothing more than a combination of an infinite number of infinitely small particles of every homogenous substance.

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[28] Si aliquid fit, necesse est quod fiat aut ex ente aut ex non ente. Sed horum alterum excludebat, scilicet quod aliquid fieret ex non ente, propter communem opinionem philosophorum supra positam. Unde concludebat reliquum membrum, scilicet quod aliquid fiat ex ente: puta si aer fit ex aqua, quod aer prius existit. Non autem diceretur quod aer fiat ex aqua, nisi in aqua praeexisteret aer: unde volebat accipere quod omne quod fit ex aliquo, praeexisteret in eo ex quo fiebat. Sed quia hoc videbatur contra id quod apparet sensui (non enim apparet ad sensum quod illud quod generatur ex aliquo, praeexistat in eo), ideo hanc obiectionem excludebat per hoc quod ponebat, quod id quod fit ex aliquo, praeexisteret in eo secundum quasdam partes minimas, quae sunt nobis insensibiles propter suam parvitatem. Puta si aer fit ex aqua, partes aliquae minimae aeris sunt in aqua, non autem in illa quantitate in qua generatur: et ideo per congregationem illarum partium aeris ad invicem et segregationem ex partibus aquae, dicebat fieri aerem. Habito igitur hoc, quod omne quod fit ex aliquo, praeexistat in eo, assumebat ulterius omne ex omni fieri: unde concludebat quod quodlibet esset in quolibet permixtum secundum partes minimas et insensibiles. Et quia infinities unum ex alio fieri potest, infinitas partes minimas in unoquoque esse dicebat. *In Phys.*, Bk. 1, *lectio* 9, vol. 2, p. 28.

### 3. The First Four Answers Taken Together

At this point, having examined in some detail four ancient answers to the question, *Quid sint principia naturae*?, perhaps we should make some observations which consider all four of these answers or positions together. The first thing to note is that, as was observed above, the four answers which we have just examined seem in some way to exhaust the kinds of answers that may be given to the question, *Quid sint principia naturae*? For the answer to this question must involve either one mobile principle of nature or many mobile principles of nature. If the latter, then the number of principles named must be finite or infinite. If the latter, then either the infinite number of principles of nature must be of one kind or of many kinds.

Second, it is not difficult to see that the number of principles of nature posited by each of the ancient answers or positions is equivalent to the number of natural substances which each of the respective answers or positions posits to exist in the natural world. More concretely, this is to say that just as Thales holds there to be but one mobile principle of nature (i.e., water), so too he holds that there is but one natural substance that exists (i.e., water). In the same way, just as Empedocles maintains that there are only four principles of nature (i.e., fire, air, water, earth), so too he maintains that there are only four natural substances which exist (i.e., fire, air, water, earth). Similarly, Democritus thinks both that there are an infinite number of principles of nature, all of the same kind (i.e., the atoms), and that there are an infinite number of natural substances, all of the same kind, which exist in the world (i.e., the atoms). Lastly, Anaxagoras too maintains that there is a correspondence between the number of principles of nature (i.e., an infinite number of principles of many different kinds) and the number of natural substances in the natural world (i.e., an infinite number of natural substances of many really different kinds). Hence, according to Thales,

Empedocles, Democritus, and Anaxagoras, it is true to say, on the one hand, that the principles of nature are none other than the natural substances that exist and make up the natural world and, on the other hand, that the natural substances which exist and make up the natural world are none other than the principles of nature.[29]

Third, it is significant to note that these four ancient answers to the question, *Quid sint principia naturae*?, end up positing two distinct ways in which the natural substances which are most known to us come to be from their principles. More specifically, the kind of answer given by Thales attempts to explain the coming to be of all such natural substances through the condensation and rarefaction of the one natural substance which exists. On the other hand, the kind of answer given by Empedocles, Democritus, and Anaxagoras attempts to account for the coming to be of these same natural substances through the congregation and segregation of the many natural substances which exist (some positing that these many natural substances are finite in number, others positing that these substances are infinite in number).[30]

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[29] Commenting on something which Aristotle says regarding this very point in *Physics* Bk. 1, ch. 2, St. Thomas says: "Et dicit quod similiter physici, inquirentes de iis quae sunt, idest de entibus, quaerunt quot sint, utrum scilicet unum aut plura; et si sint multa, utrum sint finita vel infinita. Et ratio huius est, quia antiqui physici non cognoverunt nisi causam materialem, de aliis autem causis parum tetigerunt. Ponebant autem formas naturales esse accidentia, sicut et artificiales: sicut ergo tota substantia artificialium est eorum materia, ita sequebatur secundum eos quod tota substantia naturalium esset eorum materia. Unde qui ponebant tantum unum principium, puta aerem, putabant quod alia entia essent aer secundum suam substantiam: et simile est de aliis opinionibus. Et hoc est quod dicit, quod physici quaerunt *ex quibus sunt quae sunt*: idest, inquirendo de principiis inquirunt causas materiales, ex quibus entia esse dicuntur. Unde patet quod quando inquirunt de entibus, utrum sint unum aut plura, eorum inquisitio est de principiis materialibus, quae elementa dicuntur." *In Phys.*, Bk. 1, *lectio* 2, vol. 2, p. 8.

[30] In *Physics* Bk. 1, ch. 4, Aristotle recognizes, in a formal way, these two ways of attempting to explain the coming to be of all natural substances. Commenting on Aristotle's text, the Angelic Doctor has the following to say: "Dicit ergo primo quod secundum opinionem naturalium philosophorum, duo sunt modi secundum quos generantur res ex principiis. Quorum unum tangebant philosophi naturales ponentes unum tantum principium materiale; sive esset unum de tribus elementis, scilicet igne, aere et aqua (quia terram solam nullus posuit principium, ut supra dictum est), sive aliquod medium inter ea, ut puta quod esset densius igne et subtilius aere. Ab isto autem uno principio dicebant omnia alia generari secundum raritatem et densitatem; ut puta, qui ponebant aerem principium, dicebant quod ex eo rarefacto generatur ignis, ex eo autem condensato generatur aqua. Rarum

Fourth and finally, it becomes clear on examination that all four of the ancient answers to the question, *Quid sint principia naturae?*, deny the existence of every kind of becoming except becoming according to place. We observed above that this is the case with the answers or positions of Empedocles, Democritus, and Anaxagoras. However, we did not determine above whether this is the case with the answer or position provided by Thales. Yet, once we consider what rarefaction and condensation consist in, it becomes evident that, according to Thales as well, the only kind of becoming that there is under the sun is becoming according to place. Regarding the nature of rarefaction and condensation, Aristotle says the following:

> But "rare" and "dense" and "rough" and "smooth" might seem to signify how, yet such things appear to be foreign to the division which concerns "how." For each of these appears rather to manifest a certain position of parts. For [a thing] is dense by the parts being close to each other, rare by being distant from each other; and smooth by the parts lying somehow on a straight line, rough by one being above, one below.[31]

Applying what Aristotle says here to Thales's position, we see that the rarefaction of water must consist in the movement of the various parts of water away from each other. Similarly, the condensation of water must consist in the movement of the various parts of water closer to each other. Hence, we can say that according to all four of ancient answers to the question, *Quid sint*

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autem et densum sunt contraria; et reducuntur ad excellentiam et defectum, ut ad quaedam universaliora: nam densum est quod habet multum de materia, rarum autem quod parum....

Alii vero antiqui naturales ponebant res fieri ex principiis, ex hoc quod ipsa contraria et diversa extrahebantur ab uno, in quo erant quasi commixta et confusa...." *In Phys.*, Bk. 1, *lectio* 8, vol. 2, pp. 24-25.

[31] *Categories*, ch. 8, 10a17-10a25. St. Thomas often states that, according to the kind of position advocated by Thales, all becoming is nothing other than "alteration." See, for example, *ST* I, q. 76, a. 4, vol. 5, p. 224. Indeed, Aristotle says the same thing in *Physics* Bk. 1, ch. 4, 187a31. Nonetheless, this text from the *Categories* ought to indicate to us that, when St. Thomas and Aristotle speak of "alteration" in these texts, they do not mean qualitative change specifically, but accidental change more generally. Moreover, when he says, "...densum est quod habet multum de materia, rarum autem quod parum" (*In Phys.*, Bk. 1, *lectio* 8, vol. 2, p. 24), St. Thomas seems to make it clear that he agrees with Aristotle's teaching in the *Categories*. In *In Sent.*, Bk. 4, d. 12, q. 1, a. 1, qc. 3 *ad 6um*, St. Thomas states: "non...est densitas materia multa existens sub parvis dimensionibus, sed proprietas quaedam consequens ex hoc quod materia sic se habet."

*principia naturae*?, there is no becoming over and above becoming according to place.

## 4. Heisenberg's Answer

Now the fifth and final answer to the question, *Quid sint principia naturae*?, which we shall examine in this chapter, is the modern answer or position provided by some modern physicists.[32] In an address given in 1948 entitled, "Fundamental Problems of Present-day Atomic Physics," Werner Heisenberg describes the state of atomic physics in the following words:

> If we compare the present state of atomic physics with that of 150 years ago, we can immediately say that our modern views are much closer to the fundamental aim of atomic theory, which was an explanation of nature based on one homogeneous substance. In place of the hundred odd independent basic chemical substances we now have only three, which should be more accurately called three fundamental forms of matter, whose atoms we name electrons, protons, and neutrons. All matter, dead or living, consists of these three kinds of elementary particles and of nothing else. Qualitative differences are caused by the different arrangements and relative positions of these three basic units. The multiplicity of possible phenomena finds its reflection in the multiplicity of mathematical structures which can be realized with three basic forms of Being.[33]

Two principal points should be noted here. First, in this text Heisenberg explicitly states the aim or end of atomic theory as such. As he puts it, this part of physics attempts to explain all natural things "based on one homogeneous substance." That is, atomic theory is looking for or attempting to discover that first substance from which all natural substances come to be. It is clear, then, that this modern approach to natural substances has precisely the same general aim or end as do all four of

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[32] Here we do not pretend to have any detailed knowledge of the physics which Heisenberg is presupposing. Nor is such knowledge required on the part of our reader. For in this part of the chapter we are primarily concerned with the *philosophical* reflections made by Heisenberg, Einstein, and others on the *principia naturae*. We leave it to the physicists to judge whether such reflections finally fit with the experiments and mathematics on which they are based.

[33] Werner Heisenberg, "Fundamental Problems of Present-day Atomic Physics," in *Philosophical Problems of Nuclear Science* (New York: Pantheon Books, 1952), p. 98.

the ancient positions discussed above. In other words, both this modern position and all four of the ancient positions which we examined above are attempts at discovering the *principia naturae*.

Second, Heisenberg notes that atomic theory is seemingly close to achieving its aim insofar as it has discovered three elementary particles (i.e., the electron, proton, and neutron) which he claims are the sole composing parts of all natural substances. He says, quite determinately, that "all matter, dead or living, consists of these three kinds of elementary particles and of nothing else." What this means, of course, is that, according to Heisenberg, every man, every horse, every oak tree, and every other natural substance for that matter, is essentially nothing more than a congregation of electrons, protons, and neutrons. What, then, accounts for the differences between men, horses, oak trees, and other kinds of natural substances? According to Heisenberg, these differences are explained by differences in the "arrangements and relative positions of these three basic units." It is quite easy to see here a great similarity between this position advocated by Heisenberg and the positions of Empedocles, Democritus, and Anaxagoras.

Some years later, in his *Physics and Philosophy*, Heisenberg adds to some of the claims which he made in the text which we just examined. He writes:

> Besides the three fundamental building stones of matter – electron, proton, and neutron – new elementary particles have been found which can be created in these processes of highest energies and disappear again after a short time. The new particles have similar properties as the old ones except for their stability. Even the most stable ones have lifetimes of roughly only a millionth part of a second, and the lifetimes of others are even a thousand times smaller. At the present time about twenty-five different new elementary particles are known; the most recent one is the negative proton.
>
> These results seem at first to lead away from the idea of the unity of matter, since the number of fundamental units of matter seems to have again increased to values comparable to the number of different chemical elements. But this would not be a proper interpretation. The experiments have at the same time shown that the particles can be created from other particles. Actually the experiments have shown

> the complete mutability of matter. All the elementary particles can, at sufficiently high energies, be transmuted into other particles, or they can be simply created from kinetic energy and can be annihilated into energy, for instance into radiation. Therefore, we have here actually the final proof for the unity of matter. All the elementary particles are made of the same substance, which we may call energy or universal matter; they are just forms in which matter can appear.[34]

Again, it seems proper to note two principal points. First, Heisenberg states that physicists know that there exist many more kinds of elementary particles in addition to "the three fundamental building stones of matter" (i.e., the electron, proton, and neutron). The existence of these other kinds of elementary particles might lead one, says Heisenberg, to think that atomic theory has actually moved farther away from accomplishing its aim or end. However, Heisenberg points out that in addition to the discovery of these new kinds of elementary particles, physicists have also discovered that both these new kinds of elementary particles and "the three fundamental building stones of matter" are able to be resolved into energy and to be produced from energy.

Hence, and this is the second point, Heisenberg claims that these facts lead us to the conclusion that "all the elementary particles are made of the same substance, which we may call energy or universal matter; they are just forms in which matter can appear." In other words, the fact that all of the fundamental particles can both be resolved into energy and be produced from it shows, claims Heisenberg, that all of these fundamental particles are essentially just different forms of the same basic substance, namely, energy. The following text, taken from the same work by Heisenberg, manifests this same point even more clearly:

> In the philosophy of Democritus all atoms consist of the same substance if the word "substance" is to be applied here at all. The elementary particles in modern physics carry a mass in the same limited sense in which they have other properties. Since mass and energy are, according to the theory of relativity, essentially the same

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[34] Werner Heisenberg, *Physics and Philosophy* (New York: Harper and Brothers, 1958), pp. 159-160.

> concepts, we may say that all elementary particles consist of energy. This could be interpreted as defining energy as the primary substance of the world. It has indeed the essential property belonging to the term "substance," that it is conserved.... Energy is in fact that which moves; it may be called the primary cause of all change, and energy can be transformed into matter or heat or light.[35]

Here it is evident that Heisenberg is conceiving of energy as the most basic substance (he calls it "the primary substance of the world") that there is in the natural world. And from this one substance, maintains Heisenberg, all of the fundamental particles come to be.

It is easy to see here a great similarity between this aspect of Heisenberg's position and the position of Thales examined above. For just as Thales maintains that all things come to be from one substance (i.e., water), so Heisenberg maintains that all things come to be from one substance (i.e., energy). Indeed, this likeness becomes all the more striking if one considers what Albert Einstein and Leopold Infeld have to say regarding the relationship between what they call "matter" and "field." Regarding this, they write:

> We have two realities: matter and field.... From the relativity theory we know that matter represents vast stores of energy and that energy represents matter. We cannot, in this way, distinguish qualitatively between matter and field, since the distinction between mass and energy is not a qualitative one. By far the greatest part of energy is concentrated in matter; but the field surrounding the particle also represents energy, though in an incomparably smaller quantity. We could therefore say: Matter is where the concentration of energy is great, field where the concentration of energy is small. But if this is the case, then the difference between matter and field is a quantitative rather than a qualitative one. There is no sense in regarding matter and field as two qualities quite different from each other. We cannot imagine a definite surface separating distinctly field and matter.[36]

Thus, as far as notable contemporary physicists go, it seems that Heisenberg is not alone in his

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[35] *Ibid.*, pp. 70-71.

[36] Einstein, Albert, and Infeld, Leopold, *The Evolution of Physics* (New York: Simon and Schuster, 1954), pp. 256-257.

philosophical kinship to Thales.[37] But previously we observed there to be a similarity between another aspect of Heisenberg's position and the positions set forth by Empedocles, Democritus, and Anaxagoras. Hence, it seems to be the case that Heisenberg's position is similar, in different ways, of course, to all four of the ancient positions or answers to the question, *Quid sint principia naturae*?, which we examined above.

Regarding the similarity which we see between Heisenberg's position and the four ancient positions, Richard Connell holds the following:

> Perhaps it should be noted that the contemporary view of becoming [i.e., the position of Heisenberg and some other modern physicists] in a certain way combines both of the basic notions of the Greeks; for, although elementary particles are held to consist of energy, the superior or complex entities are thought to be constituted by the combining of elementary particles into atoms and molecules. Macroscopic bodies are aggregates or collections of molecules; molecules are combinations of atoms; atoms are combinations of elementary particles; and elementary particles are concentrated energy. In other words, material bodies are the result of two kinds of accidental becoming. Therefore, according to the modern view, "things" are accidental wholes which come to be from existing substances by a process of rarefaction and condensation together with combination and separation.[38]

We observed above that the four ancient positions which we have examined can in some way be reduced to two distinct and fundamental ways of attempting to explain the coming to be of the natural substances which are most known to us. On the one hand, Thales and others attempt to

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[37] Yet another, more contemporary, particle physicist who seems to have a similar Presocratic understanding of the *principia naturae* is Stephen Weinberg. See Weinberg's, *Dreams of a Final Theory* (New York: Pantheon Books, 1993). After reviewing Weinberg's position on subatomic particles as the ultimate governing principles of all that exists, Fr. Lawrence Dewan states: "It is significant that Weinberg thinks what he should be after is 'fundamental constituents.' This means that he looks to some elementary *kind of thing* as what is fundamental. That is, he has not the idea of primary matter in the Aristotelian sense, and so his ontology is really mechanistic, which is to say that he sees all forms as accidental." Hence, Fr. Dewan concludes, "Weinberg seems to me to be at a Presocratic stage of metaphysics." From Fr. Dewan's, *Form and Being: Studies in Thomistic Metaphysics* (Washington, D.C.: CUA Press, 2006), p. 103, n. 19 and p. 104, respectively.

[38] Richard Connell, *op. cit.*, pp. 56-57.

explain the coming to be of the natural substances which are most known to us through the condensation and rarefaction of some one first natural substance. On the other hand, Empedocles, Democritus, and Anaxagoras all attempt to explain the coming to be of these same natural substances through the congregation and separation of many first natural substances. What Connell seems to be saying here is that Heisenberg's position is finally a combination of both of these fundamental ways of attempting to explain the coming to be of natural substances which we find in the ancient philosophers. For, on the one hand, like Thales and others, Heisenberg attempts to explain the coming to be of the elementary particles through the condensation and rarefaction of some first substance (i.e., energy). Then, on the other hand, like Empedocles, Democritus, and Anaxagoras, Heisenberg attempts to explain the coming to be of "macroscopic bodies," such as men, horses, oak trees, and other such things, through the congregation and separation of many (though not first) substances (i.e., the elementary particles).[39]

Having come to this point, it is not difficult to see the way in which Heisenberg and various other modern physicists must answer the question, *Quid sint principia naturae*? Their answer must either be *energy* (if we are speaking of the elementary particles themselves) or *many particles of condensed energy* (if we are speaking of the macroscopic bodies, such as men, horses, oak trees, and other such things).

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[39] It should be noted that Connell is careful in stating his understanding of Heisenberg's position. For, as we saw above, he says that Heisenberg's position, "*in a certain way* combines both of the basic notions of the Greeks..." (emphasis added). This qualification is important, since no position could simply speaking combine both of the "basic notions of the Greeks" without involving a contradiction. For the first natural substance from which the natural substances which are most known to us come to be must either be one or many, but not both. Thales and others say that there is just one such substance, while the other three philosophers say that there are many such substances. Bearing this in mind, we should say that, finally, Heisenberg's position is reducible more to the kind of view maintained by Thales and others than to the kind of position maintained by Empedocles, Democritus, and Anaxagoras. For, in the end, Heisenberg's position says that there is one first natural substance (i.e., energy) from which all natural substances come to be, even if only some of these natural substances come to be from this one first natural substance immediately.

## 5. *Ancient Philosophical Monism* and *Ancient Philosophical Pluralism*

Now that we have examined all five of the positions or answers to the question, *Quid sint principia naturae*?, which we set out to examine at the beginning of this chapter, it should be clear that these five positions in fact reduce to two fundamental positions or answers to this question. As we have seen, the first of these fundamental positions maintains that there is one first natural substance from which, through condensation and rarefaction, all of the natural substances which are most known to us come to be. Hence, according to this first fundamental position, all of the natural substances which are most known to us essentially consist in either a condensed or rarified form of the one first substance. Now, for the sake of convenience in our considerations below, we shall refer to this first fundamental position or answer to the question, *Quid sint principia naturae*?, as *Ancient Philosophical Monism*[40] or *Monism* for short.

The second of these fundamental positions holds that there are many first natural substances from which, through congregation and separation, all of the natural substances which are most known to us come to be. Thus, according to this second fundamental position, all of the natural substances which are most known to us essentially consist in the many first substances having been combined or separated in some way. Again, for the sake of convenience, we shall refer to this position or answer to the question, *Quid sint principia naturae*?, as *Ancient Philosophical Pluralism* or *Pluralism* for short.

Given these two positions, it is possible, as we have seen, for a thinker either to hold to one

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[40] The reason for naming this kind of monism "ancient" is obvious. And it seems reasonable to call this sort of monism "philosophical" in order to distinguish it from what might be termed "scientific" monism. While the former is reasoned to on the basis of what we known from our common experience, the latter might be reasoned to on the basis of what we take to be the case from more specialized experience (Heisenberg seems to provide us with a good example of this scenario in the texts cited above).

of these positions by itself (i.e., *Monism* or *Pluralism*), as Thales, Empedocles, Democritus, and Anaxagoras do, or to hold to both of these positions *in a certain way*[41] (i.e., both *Monism* and *Pluralism*)[42], as do Heisenberg and other physicists who agree with his understanding of the subatomic world. In fact, since it looks as though that from which all of the natural substances which are most known to us come to be must be either one substance or many substances, it seems that we have arrived at an exhaustive enumeration of all of the possible ways of accounting for the coming to be of the natural substances which are most known to us and, hence, of all of the possible ways of answering the question, *Quid sint principia naturae*?[43]

Now it was stated at the outset of this chapter that our aim here is to examine five attempts to answer the question, *Quid sint principia naturae*?, with an eye to seeing whether any of these answers comport with (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself. Since, at this point, we have examined all five of these aforementioned attempts at answering this question, it remains for us to discern whether any of these answers fit with these three things which are known to us from our common experience and which initially stirred us to ask the question, *Quid sint principia naturae*? We shall do this by determining whether or not either *Monism* or *Pluralism*, or both *Monism* and *Pluralism* comport with or fail to

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[41] For the reason why the qualification, "*in a certain way*," is added here, see the previous footnote.

[42] Given what was said in footnote 40, Heisenberg's position is, more properly speaking, a certain mix of "modern scientific monism" and "modern scientific pluralism." But granting this, what is more important for our purposes is simply to see that Heisenberg's position is a certain combination of monism and pluralism, whether they be ancient or modern, philosophical or scientific.

[43] The seeming exhaustiveness of the positions or answers to the question, *Quid sint principia naturae*?, is a topic to which we shall return at the end of this chapter.

comport with these things which we know, or at least think that we know, from our common experience.

Now in what follows, we shall attempt to show, *via* three arguments, that both *Monism* and *Pluralism* finally deny all three of these things which are known to us from our common experience and which they are called on to account for or to explain. But, so as to show this to be the case in an orderly and thorough manner, we shall present and explain each of these three arguments separately along with any supporting arguments which are needed in order to manifest the premises of each argument.

*Argument #1*

> No becoming in which the material principle is some substance(s) is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.
> But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).
> Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.

The major premise in this syllogism supposes that the kind of becoming we are speaking of is one whose material principle consists in some substance or substances. Given this, this premise involves a twofold denial. First, it denies that that to which the becoming is attributed, taken precisely as such, is one substance.[44] Second, it denies that that at which the becoming is terminated, taken

[44] That to which the becoming is attributed can also be called the *terminus a quo*, for it can be considered to be that *from which* the becoming begins.

precisely as such, is one substance.[45] Neither denial requires much explanation in order to make it manifest. However, perhaps an particular example of what is being said by each denial would prove somewhat helpful.

Let us imagine the change wherein a lump of bronze becomes a statue of Mr. Smith. In this example, the lump of bronze itself is precisely that to which the becoming is attributed (for it is this lump of bronze which we say "becomes shaped like Mr. Smith"). Similarly, the bronze with the shape of Mr. Smith in it is precisely that at which the becoming terminates (for the change ceases once Mr. Smith's shape has been introduced into the bronze). With these things in mind, the truth of the major premise becomes clear. First, it is clear that that to which the becoming is attributed, taken precisely as such, is not one substance. For, while it may be true that the bronze itself is one substance, the lump of bronze (or, the bronze considered as having an undefined shape) is not, precisely as such, one substance. Rather, taken precisely as such, the lump of bronze is one substance (i.e., assuming that the bronze is one substance) together with an accident (i.e., some undefined shape).

Something similar holds, of course, if we conceive of the material principle as many substances, rather than one. If, for example, we start with many men who, through being properly ordered, become a basketball team, then it is manifest, here too, that that to which the becoming is attributed is not one substance. For if one lump of bronze, taken precisely as such, is not one substance, then, *a fortiori*, neither are many men.

Using these same examples, we can see that the things at which the becomings in question

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[45] Likewise, that at which the becoming is terminated can also be called the *terminus ad quem*, since it is that *at which* the becoming ends or terminates.

terminate, taken precisely as such, also fail to be undivided substances. For, again, even if the bronze itself is one substance, the bronze together with the shape of Mr. Smith is certainly not one substance. Rather, taken precisely as such, the bronze statue of Mr. Smith is a substance (i.e., again, assuming that the bronze is one substance) together with an accident (i.e., the shape of Mr. Smith). Likewise, even if the individual men themselves are undivided substances, the basketball team, at which the becoming terminates, is evidently not one substance. Hence, in neither case is that at which the becoming terminates, taken precisely as such, one substance.

The minor premise of this syllogism is clear from the foregoing explanations of *Monism* and *Pluralism*. *Monism* maintains that every becoming which we think is a substantial becoming is a becoming in which the material principle is one substance. *Pluralism*, on the other hand, holds that every becoming which we think is a substantial becoming is a becoming in which the material principle is many substances.

Lastly, given the fact that this first argument has a valid syllogistic mood of the first figure, it is clear that the aforementioned conclusion necessarily follows from the premises which we have just defended.

*Argument #2*

> No becoming in which the material principle is some substance(s) is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.
> But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).
> Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or

> familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.

In this argument, the major premise maintains that if the material principle in a becoming is some substance(s), then that to which the becoming is attributed and that at which the becoming terminates do not really differ in kind. The reason this is true is that, in such a becoming, that to which the becoming is attributed and that at which the becoming terminates both consist in the very same substance(s). Illustrating this through examples, we can say that, if the material principle in a certain becoming is a lump of bronze, then that to which the becoming is attributed (i.e., the lump of bronze) and that at which the becoming terminates (i.e., the bronze statue of Mr. Smith) do not really differ in kind. For, after all, it is the very same bronze which is there before and after the becoming in question. Thus, even though that to which the becoming is attributed (i.e., the lump of bronze) and that at which the becoming terminates (i.e., the bronze statue of Mr. Smith) differ from each other accidentally, nonetheless, they are not different in kind, for they are one and the same substance. In a similar way, if the material principle consists in many men, then that to which the becoming is attributed (i.e., these men) and that at which the becoming terminates (i.e., this basketball team) do not really differ in kind. For, as with the first example, since it is the very same substances which compose both "these men" and "this basketball team," the former and the latter can differ only accidentally, rather than in kind.[46]

As with the first argument, the minor premise of this syllogism is manifest from the foregoing explanations of *Monism* and *Pluralism*. For, as was stated above, *Monism* maintains that every

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[46] St. Thomas puts the reason this way: "tota substantia artificialium est eorum materia..." *In Phys.*, Bk. 1, *lectio* 2, vol. 2, p. 8. See also, *In Sent.*, Bk. 4, d. 1, q. 1, a. 1, qc. 5, *ad* 1*um*, vol. 4, p. 16.

becoming which we think is a substantial becoming is a becoming in which the material principle is one substance. And *Pluralism*, on the other hand, states that every becoming which we think is a substantial becoming is a becoming in which the material principle is many substances.

Lastly, given the fact that this argument is another instance of a valid syllogistic mood in the first figure, the conclusion necessarily follows from the premises which we have just defended as true.

*Argument #3*

> No becoming in which the material principle is some substance(s) is indeed a substantial becoming.
> But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).
> Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is indeed a substantial becoming.

The major premise of this argument primarily depends on the difference between substantial becoming and accidental becoming. The difference between these two kinds of becoming was laid out, at least in a preliminary way, in the previous chapter. There we observed that substantial becoming involves the coming to be of a substance which previously did not exist. Also, we saw there that accidental becoming involves the acquisition or reception of a new accident by an already existing substance (e.g., Mr. Smith might sit in the sun and, thus, come to have a new tan; or he might consume much food and, thus, come to have some new girth; or he might walk into the marketplace and, thus, come to be in a new place). Now given this distinction between substantial

becoming and accidental becoming, the truth of this major premise is apparent. For, it is evident that if the material principle in a becoming is some already existing substance(s), then the becoming in question must be an accidental becoming as opposed to a substantial becoming.[47]

Again, the minor premise of this argument is evident from *Monism* and *Pluralism*. And, it is clear that the conclusion of this argument necessarily follows from the premises which we have just argued to be the case. For this argument, as the two others preceding it, has a valid syllogistic mood from the first figure.

From these three arguments, then, it is evident that both *Monism* and *Pluralism* finally deny the three things known to us from our common experience which they are called on to account for or explain. That is, both *Monism* and *Pluralism* end up denying 1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself.

Furthermore, it is not difficult to see that the reason why both *Monism* and *Pluralism* logically result in these denials is that they both maintain that it is substance which underlies the changes which we understand to be instances of substantial becoming. In other words, it is precisely because *Monism* and *Pluralism* maintain that men, horses, oak trees, and other such things come to be from some already existing substance or from some already existing substances, respectively, that

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[47] From our common experience, we see that there is a certain similarity between the way in which the more complex substances come to be from nature and the way in which the more complex artefacts come to be from art. For in both cases we see that the more complex comes to be from the more simple. We can also note that both in nature and in art the more complex the substance or artefact the more varied are the kinds of parts which make up the substance or the artefact. Thus, a man, who is a very complex substance, has many different kinds of parts as does a house, which is a very complex artefact.

Now it is important to see here that according to *Monism* and *Pluralism* there is not just a likeness between the coming to be of a natural substance and the coming to be of an artefact, but rather a certain sameness. In other words, according to *Monism* and *Pluralism*, the change whereby a natural substance comes to be and the change whereby an artefact comes into being are one in kind.

both of these positions end up denying that these natural substances which are most known to us are undivided natural substances of many different kinds which change into one another. Thus, it is not by accident that the three minor premises of the three syllogisms above all make mention of the fact that *Monism* and *Pluralism* hold that every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes into being, ceases to be, or assimilates food to itself) is a becoming in which the material principle consists in some substance(s).

### 6. A Possible Response and an Ensuing Dilemma

At this point it seems that the important question is this: What is the proper response to *Monism* and *Pluralism* in light of the fact that both of these positions or answers to the question, *Quid sint principia naturae*?, finally deny these three aforementioned things which we know, or at least think that we know, from our common experience? It seems that the most natural response would be to say that both *Monism* and *Pluralism* are false positions or false answers precisely insofar as they deny these three things. The reasoning behind this "most natural response" is captured in the following hypothetical syllogism: If a position or answer to the question, *Quid sint principia naturae*?, is true, then it must account for or explain all three of the aforementioned things which we know, or at least think that we know, from our common experience. But neither *Monism* nor *Pluralism* accounts for or explains all three of these things. Hence, neither *Monism* nor *Pluralism* is the true position or true answer to the question, *Quid sint principia naturae*?. Now the reasoning which stands behind the "most natural response" initially appears insurmountable. However, this apparent insurmountability begins to vanish once we recall that the philosophers, whose particular

versions of *Monism* or *Pluralism* we have examined here, seem to have been forced by the truth itself to deny these three things which we claim to know from our common experience. That is, from the particular versions of *Monism* and *Pluralism* which we have examined in this chapter, it seems to be that *every* attempt at assigning the principles of nature or answering the question, *Quid sint principia naturae*?, necessarily involves not only a denial of the reality of the substantial unity of natural substances which are most known to us, but also of their real differences in kind, as well as of the reality of the substantial becomings which we think they are involved in.

Why is this so? Perhaps we can best answer this query by recalling the argument which, according to St. Thomas, led Anaxagoras to maintain that there is finally no substantial becoming in the natural world. For, according to St. Thomas, Anaxagoras saw quite clearly that whenever this substance of this kind becomes that substance of that kind, some material principle changes from being this substance of this kind to being that substance of that kind. Now this material principle is either a non-substance or a substance. But this material principle cannot be a non-substance. For if it were, then a non-substance would become a substance and, therefore, it would be true to say that "a non-substance is a substance," which is absurd. Furthermore, if the material principle were a non-substance, then the material principle would really be nothing (for it would be neither a substance nor some accident[s])[48], and, hence, we would be forced to posit a becoming which has nothing that underlies it. But a becoming in which there is nothing which becomes is impossible. Hence, it is clear that the material principle in question cannot be a non-substance.

But since non-substance and substance are opposed as contradictories, if the material

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[48] The material principle would not be a substance since, *ex hypothesi*, it is a non-substance. But if the material principle is not a substance, then neither can one hold that some accident underlies what we commonly call "substantial becoming." For every accident is in some substance as in its proper subject.

principle in question is not a non-substance, then it must be a substance.[49] But if the material principle in question is a substance, then the becoming which this material principle underlies must be an accidental becoming. For whenever a substance underlies a becoming, the substance in question only changes from being in this respect to being in that respect. Hence, it seems that we must hold that the becomings which, through our common experience, we perceive to be substantial in nature, are in truth only accidental becomings. That is, whenever we think we see this substance of this kind becoming that substance of that kind, what is really occurring is that some substance is merely changing from being in this respect to being in that respect. But if it is true that every supposed substantial becoming is, in truth, only an accidental becoming, then we also have to maintain that neither that to which every such becoming is attributed nor that at which every such becoming terminates is, taken precisely as such, one substance. Similarly, we have to deny that that to which every such becoming is attributed and that at which every such becoming terminates truly differ in kind.

So, quite contrary to what we termed the "most natural response" to *Monism* and *Pluralism*, it now appears that we are logically bound to hold to some version of either *Monism* or *Pluralism* (or, perhaps some combination of the two, as does Heisenberg), if we are to claim to have knowledge of the principles of nature or to claim to be able to answer the question, *Quid sint principia naturae*?[50] Or, to put the same basic point somewhat differently, it seems to be the case that the

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[49] Furthermore, the proponents of *Monism* and *Pluralism* might point out that whenever we attempt to imagine the material principle which underlies the becoming of the natural substances which are most known to us, we always imagine some kind of substance to be the material principle in question.

[50] It seems, then, that *every* answer to the question, *Quid sint principia naturae*?, must necessarily undermine the things which we think we know from our common experience which moved us to ask this question in the first place.

philosophers who hold to *Monism* and *Pluralism* have made clear to us that there is a fundamental contradiction latent in the three things which we claim to know from our common experience. For, these philosophers seem to have shown that it is impossible to hold that the natural substances which are most known to us are natural substances of many different kinds which change into one another.

It appears, then, that we have arrived at a sort of "fork" in the intellectual road along which we have been traveling. Now seemingly a choice must be made regarding the way we are to go. On the one hand, we might adopt some form of *Monism* or *Pluralism* and thereby abandon the three aforementioned things which seem to be very well known to us from our common experience. Or, on the other hand, we might hold onto our "knowledge" of these three things and reject as false both *Monism* and *Pluralism*. While the first of these options sacrifices a great deal of our common experience for the sake of having an understanding of the *principia naturae*, the second seems to sacrifice an understanding of the *principia naturae* for the sake of preserving a great deal of our common experience.

Perhaps, at this point, it would be somewhat instructive to mention the similarity between the dilemma which we have found our way into here and the one which Sir Arthur Eddington addresses in the introduction to his work, *The Nature of the Physical World*. For, in that text, Eddington makes the claim that there exist two related but different "worlds," namely, the world as known by common experience and the world as understood by science. Regarding this matter, Eddington writes:

> I have settled down to the task of writing these lectures and have drawn up my chairs to my two tables. Two tables! Yes; there are duplicates of every object about me – two tables, two chairs, two pens....
>
> One of them has been familiar to me from earliest years. It is a commonplace object of that environment which I call the world. How shall I describe it? It has

> extension; it is comparatively permanent; it is coloured; above all it is *substantial.* By substantial I do not merely mean that it does not collapse when I lean upon it; I mean that it is constituted of "substance" and by that word I am trying to convey to you some conception of its intrinsic nature. It is a *thing*; not like space, which is a mere negation; nor like time, which is – Heaven knows what! But that will not help you to my meaning because it is the distinctive characteristic of a "thing" to have this substantiality, and I do not think substantiality can be described better than by saying that it is the kind of nature exemplified by an ordinary table.[51]

After this, Eddington goes on to describe table number two as a table of more recent acquaintance. It is only known to him through experiment and scientific reasoning. Moreover, it differs radically from the first table. Concerning this second table, Eddington says:

> My scientific table is mostly emptiness. Sparsely scattered in that emptiness are numerous electric charges rushing about with great speed; but their combined bulk amounts to less than a billionth of the bulk of the table itself....
>
> There is nothing *substantial* about my second table. It is nearly all empty space – space pervaded, it is true, by fields of force, but these are assigned to the category of "influences", not of "things". Even in the minute part which is not empty we must not transfer the old notion of substance. In dissecting matter into electric charges we have travelled far from that picture of it which first gave rise to the conception of substance, and the meaning of that conception – if it ever had any – has been lost by the way....[52]
>
> I need not tell you that modern physics has by delicate test and remorseless logic assured me that my second scientific table is the only one which is really there – wherever "there" may be. On the other hand I need not tell you that modern physics will never succeed in exorcising that first table – strange compound of external nature, mental imagery and inherited prejudice – which lies visible to my eyes and tangible to my grasp.[53]

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[51] Sir Arthur Eddington, *The Nature of the Physical World* (New York: The MacMillan Co., 1929), pp. ix-x.

[52] It is worth noting that insofar as Eddington denies here that the name "substance" can be extended to subatomic realities, he is disagreeing with Heisenberg. For, as we saw above, Heisenberg explicitly maintains that even energy can be termed "substance" since it is what underlies the coming to be of subatomic particles from beginning to end. Nonetheless, this disagreement between Eddington and Heisenberg does not impact the main point which we intend to manifest here, to wit, that according to Eddington there is the world of our common experience and the world of scientific understanding and that, in some way, these two worlds stand opposed to each other.

[53] Sir Arthur Eddington, *The Nature of the Physical World*, pp. ix-x.

It seems, then, from the end of this text at least, that when faced with the dilemma of the two related but different "worlds" (i.e., the substantial world known by our common experience and the non-substantial world known by science), Eddington finally maintains that the world which is more real is the non-substantial world known by science. For, as he puts it, "modern physics has by delicate test and remorseless logic assured me that my second scientific table is the *only* one which is really there."[54] No doubt before studying modern physics, Eddington used to think that the only table (or "world," for that matter) which existed was the ordinary substantial one of his common experience. Yet after having studied modern physics and after having been moved "by delicate test and remorseless logic," Eddington came to think that the only table (or "world") which exists is the non-substantial one known by science.

In light of this text from Eddington, then, it seems we should ask the following question: Have the proponents of *Monism* and *Pluralism* truly demonstrated "by remorseless logic" that the *only* way to answer the question, *Quid sint principia naturae?*, is one which involves maintaining that every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s)? If so, it seems as though we must assent to some form of *Monism* or *Pluralism* even if this entails denying that the natural substances which are most known to us are undivided natural substances of many different kinds which change into one another. But if, on the other hand, the proponents of *Monism* and *Pluralism* have not truly demonstrated this to be the case, then perhaps there is still some hope that we might discover an

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[54] Emphasis added. Now although Eddington maintains this, he also holds that the two worlds "are ultimately to be identified after some fashion. But the process by which the external world of physics is transformed into a world of familiar acquaintance in human consciousness is outside of the scope of physics," *Ibid.*, p. xii.

answer to the question, *Quid sint principia naturae*?, which comports with all of the things which we think we know from our common experience.

But how are we to determine this matter? It seems that, in order to do so, we must first determine whether there is a proper method which must be followed, if we are truly to answer the question, *Quid sint principia naturae*?; and, second, assuming that there is indeed such a proper method, we must determine whether or not the proponents of *Monism* and *Pluralism* have indeed followed this method as they have offered their answers to the question, *Quid sint principia naturae*?. In the next chapter we shall attempt to determine whether or not there is such a proper method.

## 7. Résumé

The end of this chapter has been to examine five attempts, four ancient and one modern, to answer the question, *Quid sint principia naturae*?, with an eye to seeing if any of these positions provides us with an account of the substantial unity of the substances involved in substantial becoming, their differences in kind, and the reality of substantial becoming itself. In the course of our examination we observed that the first ancient position (that of Thales) consists in a kind of *Monism*, the three remaining ancient positions consist in a kind of *Pluralism*, and the modern position of Heisenberg and others is a sort of combination of the *Monism* and *Pluralism* found in the ancient positions. This being said, we also showed, by means of three arguments, that neither *Monism* nor *Pluralism* (nor, as a result, Heisenberg's position) can possibly account for any of the three aforementioned things which we know from our common experience. On the contrary, each of these fundamental positions, as well as any possible combination of them,

necessarily implies that "the natural substances" which are most known to us are not really undivided substances, that they do not really differ in kind, and that substantial becoming is nonexistent. Moreover, we saw that these implications follow from both *Monism* and *Pluralism* precisely insofar as these positions maintain that the material principle(s) from which "the natural substances" which are most know to us come to be is/are some substance(s). Given these things, it is incumbent on us to investigate whether we must adopt some form of *Monism* or *Pluralism* or whether there might remain some other possible way to answer the question, *Quid sint principia naturae*?

## Chapter Three: The Proper *Modus Procedendi*

Having come to this point in the essay, we have seen that if we are truly to answer the question, *Quid sint principia naturae*?, we must first determine what the proper *modus procedendi* is which must be followed in order to answer this question. Now, when we speak here of "the proper *modus procedendi*," what we have in mind is a way of proceeding, proper to our subject matter, which will enable us to arrive at knowledge of the natures of the *principia naturae*.[1] Moreover, it seems reasonable to assume that what this proper *modus procedendi* consists in will become evident once we have answered both of the following questions: (1) How are we to proceed to a knowledge of the nature(s) of the *principia naturae*?, and (2) What must the character of our first knowledge of these principles be?

This chapter is dedicated to answering both of these questions and, thereby, to determining what the proper *modus procedendi* is which must be followed in order to answer the question, *Quid sint principia naturae*? We shall take up the second of these questions first, and the first of these questions second.

To begin, it is clear that the second of these two questions is concerned with determining what the nature or character of our first or initial knowledge of the principles of nature must consist in. Now if we are able to determine, more generally, that our first knowledge of any object must be of a certain kind or have a certain character, then it will necessarily follow that our first knowledge of the principles of nature must likewise be of that same certain kind or have that same certain character. So the question, then, becomes the following: What must the character of our first

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[1] In this chapter we shall be largely concerned with what St. Thomas calls the "ordo determinandi." See, *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 6. On a much related matter, see Ronald McArthur's, "Universal *in Praedicando*, Universal *in Causando*," *Laval Theologique et Philosophique* 38 (1962), pp. 59-95.

knowledge of any object be?

## 1. Our General and Confused Knowledge

Here we shall attempt to show by induction that our first knowledge of any object must be *most general* in nature. Let us begin to show that this is the case by considering our knowledge of the nature of a triangle. When we conceive of the nature of a triangle, it is evident that we do so in a variety of ways. For example, we conceive of a triangle as "plane figure," and as "rectilineal plane figure," and as " trilateral rectilineal plane figure." Now it is also clear that these three ways of conceiving of the nature of a triangle are ordered from the more general to the more specific. Further, it is clear that our more general conceptions of the nature of a triangle are before our more specific conceptions of the nature of a triangle in the order of our understanding. In other words, our more general conception, "rectilineal plane figure," is before our more specific conception, "trilateral rectilineal plane figure." We can see that this is so since we can understand the former without understanding the latter, but we cannot understand the latter without first understanding the former. Similarly, our more general conception, "plane figure," is before our more specific conception, "rectilineal plane figure." For, again, we can understand the former without understanding the latter, but we cannot understand the latter without first understanding the former. Now, if our more general conceptions of the nature of a triangle are always before our more specific conceptions of the same (and they are, for the more general conceptions of the nature of a triangle enter into the definitions of the more specific conceptions of the nature of a triangle), then it stands to reason that our first conception of the nature of a triangle (i.e., that conception of what a triangle is which we have in mind before every other conception of what a triangle is) is our most general conception of the nature

of a triangle.

Now if we were to look in detail at our knowledge of the natures of other things, we would find the same order in our understanding as we have found in the case of our knowledge of the nature of a triangle. For example, if we consider our knowledge of the nature of justice, it is clear that we conceive of the nature of justice as "habit," and as "good habit," and as "virtue." Now it is also clear that these three ways of conceiving of the nature of justice are ordered from the more general to the more specific. Further, it is clear that our more general conceptions of the nature of justice are before our more specific conceptions of the nature of justice since the former can be understood without the latter, *sed non e converso*. But, as was done above vis à vis our knowledge of the nature of a triangle, here we can state that if our more general conceptions of the nature of justice are always before our more specific conceptions of the same (and they are, for the more general conceptions of the nature of justice enter into the definitions of the more specific conceptions of the nature of justice), then our first conception of the nature of justice must be our most general conception of the nature of justice.

Similarly, if we consider our knowledge of the nature of animal, it is clear that we conceive of the nature of animal as "body," and as "living body," and as "sentient living body." Now it is also clear that these three ways of conceiving of the nature of an animal are ordered from the more general to the more specific. Further, it is clear that our more general conceptions of the nature of animal are before our more specific conceptions of the nature of animal since, again, we can understand the former without understanding the latter, but we cannot understand the latter without understanding the former. As a result, if our more general conceptions of the nature of animal are always before our more specific conceptions of the same (and they are, for the more general

conceptions of the nature of animal enter into the definitions of the more specific conceptions of the nature of animal), then it follows that our first conception of the nature of animal must be our most general conception of the same.

Now it is clear that we would find something similar to these three cases, if we were to consider our knowledge of the nature of any other object. Therefore, it is clear from induction that our first knowledge of the nature of any object must be most general in nature.[2]

But given the fact that our first knowledge of any object must be most general in nature, we can go on to ask the following question: What is it about our minds which makes it necessary for us to know something first in a most general way and only later in a more specific way? St. Thomas seems to give us the essential answer to this question when he states that "we proceed from potency to act in our understanding and...the beginning of our knowledge is from sensible things which are material and intelligible in potency."[3] In this text St. Thomas notes two important truths. First, our

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[2] Regarding this matter, see Aristotle's *Physics*, Bk. 1, Chapter 1, 184a9-184b13.

[3] For the sake of completeness I include here the fuller context of this important text from St. Thomas: "Ad manifestationem autem primae propositionis, inducit quod non sunt eadem magis nota nobis et secundum naturam; sed illa quae sunt magis nota secundum naturam, sunt minus nota secundum nos. Et quia iste est naturalis modus sive ordo addiscendi, ut veniatur a nobis notis ad ignota nobis; inde est quod oportet nos devenire ex notioribus nobis ad notiora naturae. Notandum autem est quod idem dicit nota esse naturae et nota simpliciter. Simpliciter autem notiora sunt, quae secundum se sunt notiora. Sunt autem secundum se notiora, quae plus habent de entitate: quia unumquodque cognoscibile est inquantum est ens. Magis autem entia sunt, quae sunt magis in actu: unde ista maxime sunt cognoscibilia naturae. Nobis autem e converso accidit, eo quod nos procedimus intelligendo de potentia in actum; et principium cognitionis nostrae est a sensibilibus, quae sunt materialia, et intelligibilia in potentia: unde illa sunt prius nobis nota quam substantiae separatae, quae sunt magis notae secundum naturam, ut patet in II Metaphys. Non ergo dicit notiora naturae, quasi natura cognoscat ea; sed quia sunt notiora secundum se et secundum propriam naturam. Dicit autem notiora et certiora, quia in scientiis non quaeritur qualiscumque cognitio, sed cognitionis certitudo. Ad intellectum autem secundae propositionis, sciendum est quod confusa hic dicuntur quae continent in se aliqua in potentia et indistincte. Et quia cognoscere aliquid indistincte, medium est inter puram potentiam et actum perfectum, ideo, dum intellectus noster procedit de potentia in actum, primo occurrit sibi confusum quam distinctum; sed tunc est scientia completa in actu, quando pervenitur per resolutionem ad distinctam cognitionem principiorum et elementorum. Et haec est ratio quare confusa sunt primo nobis nota quam distincta. Quod autem universalia sint confusa manifestum est, quia universalia continent in se suas species in potentia, et qui scit aliquid in universali scit illud indistincte; tunc autem distinguitur eius cognitio, quando unumquodque eorum quae continentur potentia in universali, actu cognoscitur: qui enim scit animal, non scit rationale nisi in potentia. Prius autem est scire aliquid in potentia quam in actu: secundum igitur hunc ordinem addiscendi quo procedimus de

understanding moves from ability to act. Second, our understanding of things takes its origin from our sense experience of things. But for our present purposes we should focus more on the first of these truths since it seems to provide the more proximate reason why our minds must proceed as they do.

In observing that our understanding moves from ability to act, St. Thomas has at least two things in mind. First, he has in mind the fact that we proceed from being able to understand something but not actually understanding it, to actually understanding it. Second, St. Thomas is pointing out the fact that when we proceed from being able to understand something but not actually understanding it, to actually understanding it, we do not do so *all at once*. That is, we do not proceed from being altogether ignorant of something to understanding that same something perfectly (i.e., we do not proceed from pure ability to perfect act all at once with respect to understanding some object). Rather, we understand something first of all in a confused way and only later in a distinct way. For to understand something in a confused way is to understand it only in part and imperfectly (and, hence, to understand something in this way is to be in between being altogether ignorant of it and understanding it perfectly), whereas to understand something in a distinct way is to understand it wholly and perfectly. Thus, it is true to state that *because* we proceed from being able to understand something but not actually understanding it, to actually understanding it (and this not all at once), we must come to know something in a confused way before we come to know it in a distinct way.

But in addition to this, it can be made manifest that a general understanding of something is a kind of confused understanding of something, whereas a specific understanding of something is

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potentia in actum, prius quoad nos est scire animal quam hominem." *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 5.

a kind of distinct understanding of something. The following text from St. Thomas helps to make this clear:

> But it is manifest that universals are confused since they contain in themselves their species in potency. And [thus] he who knows something in the universal knows it indistinctly, whereas his knowledge becomes distinct when he knows in act each of the things which was contained in potency in the universal. For he who knows animal does not know rational except in potency. But knowing something in potency is prior to knowing it in act. Therefore, according to this order of learning by which we proceed from potency to act, knowing animal is prior with respect to us to knowing man.[4]

Now it seems that St. Thomas's principal argument here can be put more formally as follows:

> Every kind of understanding of something which potentially contains a distinct understanding of that same something is properly called a confused understanding of something. But a general or universal understanding of something is a kind of understanding of something which potentially contains a distinct understanding of that same something. Therefore, a general or universal understanding of something is properly called a confused understanding of something.

In order to make clear the minor premise, St. Thomas points out that our understanding of animal involves a general or universal understanding of man. That is, in understanding animal or sentient living body, we do understand man, but not in a distinct way. Rather, our understanding of animal or sentient living body potentially contains a distinct understanding of man. This distinct understanding of man is achieved, of course, once we add the concept or notion of rational to the concept or notion of animal or sentient living body. Thus, it is clear that our understanding of animal

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[4] Quod autem universalia sint confusa manifestum est, quia universalia continent in se suas species in potentia, et qui scit aliquid in universali scit illud indistincte; tunc autem distinguitur eius cognitio, quando unumquodque eorum quae continentur potentia in universali, actu cognoscitur: qui enim scit animal, non scit rationale nisi in potentia. Prius autem est scire aliquid in potentia quam in actu: secundum igitur hunc ordinem addiscendi quo procedimus de potentia in actum, prius quoad nos est scire animal quam hominem. *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 5.

(which is an example of a general or universal understanding of something) is an understanding of man which potentially contains a distinct understanding of man.

Now above it was shown that *because* we proceed from being able to understand something but not actually understanding it, to actually understanding it (and this not all at once), we must come to know something in a confused way before we come to know it in a distinct way. Further, it has just been shown that a general understanding of something is a kind of confused understanding of something, whereas a specific understanding of something is a kind of distinct understanding of something. Thus, it is clear that *because* we proceed from being able to understand something but not actually understanding it, to actually understanding it (and this not all at once), we must come to know something in a general way before we come to know it in a specific way.

Let us now return to the question that we asked above: What must the character of our first knowledge of the *principia naturae* be? For at this point we have something of an answer to this question. We observed above that if we could determine that our first or initial knowledge of any object must be of a certain kind or have a certain character, then it will necessarily follow that our first knowledge of the *principia naturae* must likewise be of that same certain kind or have that same certain character. But it was shown above that our first knowledge of any object must be most general in nature and it was just pointed out why this must be the case given the nature of our minds. Hence, it necessarily follows that our first knowledge of the *principia naturae* must be most general in nature.

What bearing, though, does all of this have on how we must proceed if we are to arrive at knowledge of the *principia naturae*? Perhaps, at this point, the answer to this question is somewhat straight forward. That is, given what has been established above, we must maintain that in our

attempt to come to know what the *principia naturae* actually are, we must first of all attempt to come to know the nature(s) of these principles and causes in a most general way. And only after knowing the nature(s) of these principles and causes in a most general way will we be able to attempt to come to know the nature(s) of these same principles and causes in a more specific way.[5]

## 2. Objections and Replies

Now before we address the other question asked at the outset of this chapter, let us take up two reasonable objections which might be raised against what we have just established.

The first objection runs thus: It is clear that whenever we are looking for the definition of something, what is defined is more understandable to us than are the composing parts of the definition. For in looking for a definition we proceed from what we understand to what we do not understand. Thus, when we are looking for the definition of triangle, "triangle" (which is what is defined) is more understandable to us than are "rectilineal plane figure" and "trilateral" (which are the composing parts of the definition). But "triangle" is more specific than either "rectilineal plane figure" or "trilateral." Hence, what is more specific is more understandable to us than what is more general. But this is contrary to what was established above.

In order to reply to this objection specifically, let us see what St. Thomas teaches generally regarding the relationship of our knowledge of what is defined to our knowledge of the composing parts of its definition. He writes:

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[5] It seems worth noting that this movement of our minds from understanding something in a most general way to understanding that same something in a more specific way is a movement from what is more knowable to us but less knowable simply to what is less knowable to us but more knowable simply. For even though our most general conceptions of things are more knowable to us than our more specific conceptions of things, as we have attempted to show above, nonetheless, there is less to understand in our most general conception of something than there is in our more specific conceptions of that same something.

> But it must be said that the composing parts of the definition according to themselves are understood by us before we understand what is defined; nevertheless, what is defined is understood by us before we understand that such are the composing parts of its definition. Thus, we understand animal and rational before we understand man, but we understand man in a confused way before we understand that animal and rational are the composing parts of man's definition.[6]

Thus, in response to this particular objection, we should say that while it is clear that we understand "triangle" in a confused way before we understand that "rectilineal plane figure" and "trilateral" are the composing parts of its definition (i.e., before we understand "triangle" in a distinct way), nonetheless, it is also the case that "rectilineal plane figure" and "trilateral" must be understood by us before we understand "triangle" even in a confused way. Hence, it is true to state that our more general understanding of something is before our more specific understanding of that same something *simpliciter*, even though our more specific understanding of something might be before our more general understanding of that same something *secundum quid*.[7] As a result, this first objection leaves essentially untouched what was established above.

Now the second objection might be stated as follows: It was noted above that our understanding of things takes its origin from our sense experience. But we have no knowledge that is before or prior to our sense experience. Thus, our sense experience of things is our first

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[6] Sed dicendum quod definientia secundum se sunt prius nota nobis quam definitum; sed prius est notum nobis definitum, quam quod talia sint definientia ipsius: sicut prius sunt nota nobis animal et rationale quam homo; sed prius est nobis notus homo confuse, quam quod animal et rationale sint definientia ipsius. *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 6.

[7] This point is made by St. Thomas in *ST* I, q. 85, a. 3 *ad 3um*, vol. 5, p. 337. There he writes: "...dicendum quod pars aliqua dupliciter potest cognosci. Uno modo absolute, secundum quod in se est, et sic nihil prohibet prius cognoscere partes quam totum, ut lapides quam domum. Alio modo, secundum quod sunt partes huius totius, et sic necesse est quod prius cognoscamus totum quam partes; prius enim cognoscimus domum quadam confusa cognitione, quam distinguamus singulas partes eius. Sic igitur dicendum est quod definientia, absolute considerata, sunt prius nota quam definitum, alioquin non notificaretur definitum per ea. Sed secundum quod sunt partes definitionis, sic sunt posterius nota, prius enim cognoscimus hominem quadam confusa cognitione, quam sciamus distinguere omnia quae sunt de hominis ratione."

knowledge of things. But our sense experience is of particular sensible things. Therefore, our first knowledge of things is particular in nature and not most universal in nature.

In response to this, we should first point out that when we say "sense experience is our first knowledge" and "our first knowledge of things is most general in nature," "knowledge" is being used equivocally. For in the first of these statements "knowledge" is used with a meaning which is so general that it is predicable both of our sense experience and of our intellectual knowledge. However, in the second of these statements "knowledge" is being used with a more specific meaning in mind so as to be applicable only to our intellectual knowledge. This having been said, it becomes quite clear that these two statements are affirming different but not contradictory things. For while the first of these statements is affirming that our *sense knowledge* is before or prior to every other kind of knowledge that we might have, the second of these statements is but affirming that within the order of our *intellectual knowledge* or our *understanding* we know things in a most general way before we know them in a more specific way. Hence, when looked at closely, it is clear that this objection in no way contradicts what was established above.

Moreover, we should note that the answer to this objection helps bring to light something which hitherto has remained only implicit, namely, the way in which the objects of our sense experience are related to the objects of our understanding. Now, from what has been established above, these two things are clear: (1) our conceptions of things take their origins from our sense experience of things, and (2) our first conceptions of things must be most general in nature.[8] So,

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[8] The first of these things was noted above when we cited St. Thomas's *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 5. We take the truth of this statement for granted here. Indeed the truth of this statement seems readily apparent from our common experience. The second of these things, of course, was established by argument above.

Both of these points are harmonized in what Cajetan teaches regarding the nature of the concept of being which first falls into the intellect. See his argument for the conclusion, "ens concretum quidditati sensibili est primum cognitum cognitione confusa actuali" in his *In De Ente et Essentia, proemium*, pp. 375-378.

taking these two things together, we should say that it is through or on account of our sense experience of something that we come to our first and most general conception of that same something. Further, as we have seen above, it is through or on account of our first and most general conception of something that we come to our more specific conceptions of that same something. Thus, we can say that the order in our knowledge, broadly speaking, is as follows: (1) we have sense experience of something, (2) through or on account of our sense experience of this something, we come to have a most general conception of this same something, and (3) through or on account of our most general conception of this something, we come to have more specific conceptions of this same something. From this, then, we see that while our more specific conceptions of something are rooted in our more general conceptions (and, finally, in our most general conception) of that same something, these latter are rooted in our sense experience of the something in question.

### 3. *An Sint Principia Naturae*?

At this point we should turn our attention to the other question which we must attempt to answer in this chapter, namely, How are we to proceed to a knowledge of the nature(s) of the *principia naturae*? The first thing that should be noted about this question is that it is ordered to knowing how we are to proceed to a knowledge of *what* the *principia naturae* actually are. But we cannot know *what* something is (in the sense of perfectly understanding the *quid rei* of that something as opposed to merely understanding its *quid nominis*) unless we first know *that* the something in question actually is. In other words, whenever we proceed scientifically, we must know that the answer to the question, "*An sit*?" is in the affirmative before we even take up the

question, "*Quid sit?*"[9] With these things in mind, it seems most reasonable for us to ascertain how we come to know in the first place *that* there are *principia naturae* before we attempt to see how we must proceed, if we are to know *what* these same principles and causes actually are. For, perhaps, the way which we must travel in order to know about the existence of these principles and causes will be quite similar to the way which we must travel in order to know the nature(s) of these same principles and causes.

So, the question which we should address at this point is the following: How do we come to know that there are principles and causes of the natural substances which are most known to us? Now in order to begin to answer this question, let us note that relative names are always together in our knowledge. For example, we know "double" and "half" together, as we do "teacher" and "student," and the same with "master" and "slave" and so forth. But it is evident that "principle" and "principled" as well as "cause" and "caused" are relative names. Thus, "principle" and "principled" as well as "cause" and "caused" must be together in our knowledge.[10] Given this, it seems clear that if we can determine *when* it is that we see that the natural substances most known to us are principled and caused, then, in virtue of that, we will also know at least *when* (if not also *how*) it is that we see that there are principles and causes of these same natural substances.

But towards the end of chapter one, we examined precisely when it is that we see that the

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[9] Cf. Aristotle, *Posterior Analytics*, Bk. 2, Ch. 1-2, 89b23-90a34.

[10] This is clearly implied by what St. Thomas says in this text wherein he divides the four kinds of opposition from one another: "[Aristoteles] dicit quot modis dicuntur opposita; quia quatuor modis; scilicet contradictoria, contraria, privatio et habitus, et ad aliquid. Aliquid enim contraponitur alteri vel opponitur aut ratione dependentiae, qua dependet ab ipso, et sic sunt opposita relative. Aut ratione remotionis, quia scilicet unum removet alterum. Quod quidem contingit tripliciter. Aut enim totaliter removet nihil relinquens, et sic est negatio. Aut relinquit subiectum solum, et sic est privatio. Aut relinquit subiectum et genus, et sic est contrarium. Nam contraria non sunt solum in eodem subiecto, sed etiam in eodum genere." *In Metaphys.*, Bk. 5, *lectio* 12, p. 295 (#922). See also *Categories*, Ch. 13, 14b24-15a12.

natural substances most known to us are principled and caused. For there we examined the way in which what we know from our common experience of substantial becoming causes us to wonder about the natures of the principles and causes of the natural substances which are most known to us and, therefore, to ask the question, *Quid sint principia naturae*? First and most generally, we observed that whenever we understand that this substance of this kind becomes that substance of that kind, we also understand that there must be some principles or causes in these substances themselves owing to which the change or transformation of this substance of this kind into that substance of that kind is explained. For, as St. Thomas says, "it is necessary that every new thing has some cause."[11] Second and more specifically, we maintained that, since there must be some material principle in every becoming, whenever we understand that this substance of this kind becomes that substance of that kind, we also understand that there must be some material principle which becomes that substance of that kind. Hence, it is precisely when we understand that the natural substances which are most known to us change into one another or are transformed into one another that we understand that these same substances indeed have principles or causes within themselves or that they are principled or caused.

Now, in addition to this, these considerations also enable us to appreciate *how* we come to understand that there are principles and causes within the natural substances which are most known to us. That is, these considerations make clear that it is precisely because we understand both that "it is necessary that every new thing has some cause," and that there must be a material principle in every becoming, that come to understand that the natural substances which are most known to us have principles and causes within themselves or that they are principled and caused.

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[11] ...omne novum oportet quod habeat aliquam causam..., *SCG.*, Bk. 3, Ch. 89, vol. 14, p. 273.

At this point, then, it is necessary to elucidate how we must proceed in order to come to know *what* the natures of these principles and causes actually are. But in our attempt to bring about this end, let us first note that while we cannot know that there is some principled thing as such or some caused thing as such without also knowing that there are some principles or some causes which are responsible for the principled thing or caused thing, it is not true to state that we cannot know *in some way* what some principled thing is or what some caused thing is without also knowing what the principles or causes are which are responsible for it. A few examples may help to clarify this distinction.

When a man comes to be ill, let us say, it is clear that as soon as he recognizes that he has certain symptoms, he also recognizes that he is suffering from some illness which is responsible for those symptoms. In other words, a man cannot know that he is suffering from symptoms as such without also seeing that he has within himself some cause of those symptoms. But this being said, it is often the case that a sick man knows what his symptoms are and yet is ignorant of the nature of the illness which is causing his symptoms. Hence, while a man cannot know that he is suffering from certain symptoms without also knowing that he has a certain illness, it is also the case that a man can, and often does, know what his symptoms are without also knowing what the illness is which is causing his symptoms.

Another example which helps to illustrate this distinction has to do with our knowledge of the existence and nature of thunder. It is quite clear to us that thunder comes to be during certain storms and that it must have some cause for its coming to be. Further, we know to some extent what thunder is just from our common experience. An ordinary man, for example, might say that thunder is "a certain loud noise produced in the clouds during a storm," or something similar to this. Yet,

what is the cause of this certain loud noise? The answer to this question is not immediately clear to us. But what this manifests is that a man need not know what the answer to this question is in order to know both that thunder comes to be (and, therefore, that it has some cause for its coming to be) and what thunder is *in some way*.

A yet more global example of this same distinction can be seen in the following phenomena mentioned by Ptolemy:

> ...it is possible to see that the sun and moon and the other stars do not rise and set at the same time for every observer on the earth, but always earlier for those living towards the orient and later for those living towards the occident. For we find that the phenomena of eclipses taking place at the same time, especially those of the moon, are not recorded at the same hours for everyone – that is, relatively to equal intervals of time from noon; but we always find later hours recorded for observers towards the orient than for those towards the occident.[12]

What Ptolemy is noting here is, of course, a well known fact. We find that the farther to the East we go, the earlier do the heavenly bodies rise and set. Contrariwise, the farther we go to the West, the later do the same heavenly bodies rise and set. And we not only know that these things are the case, but we also know in some way what the natures of these events consist in. That is, we are able to define in at least some nominal way what we mean by "rising," "setting," "heavenly bodies," and so forth. Further, we readily understand that there must be some cause which accounts for these things which we experience. Yet, the precise nature of the cause of these things is not immediately apparent to us.

So, from these and other similar cases, which could be presented, we are able to see that while we cannot know that there is some principled thing as such or some caused thing as such

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[12] Ptolemy, *The Almagest*, trans. R. Catesby Taliaferro (Chicago, IL: Encyclopedia Britannica, Inc., 1994), Bk. 1, Ch. 4, p. 8.

without also knowing that there are some principles or some causes which are responsible for the principled thing or caused thing, it is not true to state that we cannot know *in some way* what some principled or caused thing is without also knowing what the principles or causes are which are responsible for it. In fact, in many cases we do know in some way what some principled or caused thing is without also knowing what the principles or causes are which are responsible for it.[13]

Now it hardly need be said that this is precisely the situation we find ourselves in as regards our knowledge, on the one hand, of the natural substances of many different kinds which change into one another and, on the other hand, of the principles and causes within these substances themselves which account for these effects. That is, as soon as we understand that this substance of this kind becomes that substance of that kind, we also understand *that* there must be some principles or causes in these substances themselves which are responsible for the change or transformation of this substance of this kind into that substance of that kind. Yet, for all this, *what* these principles and causes are still remains obscure.

### 4. *Quid Sint Principia Naturae?*

But given this, we must now ask the following question: How, in cases such as these, are we

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[13] Of course, to know in some way what some principled and caused thing is is already to grasp, albeit in a most confused and imperfect way, something of the natures of the principles and causes of that same thing. St. Thomas seems to make this point in the following text: "Et tamen sciendum quod de nulla re potest sciri an est, nisi quoquo modo sciatur de ea quid est vel cognitione perfecta vel saltem cognitione confusa, prout philosophus dicit in principio physicorum quod diffinita sunt praecognita partibus diffinitionis. Oportet enim scientem hominem esse et quaerentem quid est homo per diffinitionem scire quid hoc nomen homo significat. Nec hoc esset, nisi aliquam rem quoquo modo conciperet quam scit esse, quamvis nesciat eius diffinitionem. Concipit enim hominem secundum cognitionem alicuius generis proximi vel remoti et aliquorum accidentium quae extra apparent de ipso. Oportet enim diffinitionum cognitionem, sicut et demonstrationum, ex aliqua praeexsistenti cognitione initium sumere." *In de Trin*, q. 6, a. 3.

to come to know the natures of the principles or causes which are responsible for the principled or caused things which we already know in some way? St. Thomas provides us with the essence of the answer in this text:

> ...some things are knowable to us in virtue of themselves. And in the case of such manifest things, the speculative sciences use the definition of these things in order to demonstrate their properties, as happens in those sciences which demonstrate *propter quid*. But there are some things which are not knowable to us in virtue of themselves, but rather are knowable to us through their effects. And if an effect be adequate to its cause, the very quiddity of the effect is taken as a principle for demonstrating the existence of the cause and for investigating its quiddity, from which, in turn, its properties are shown. But if the effect be not adequate to its cause, then the definition of the effect is taken as a principle for demonstrating the existence of the cause and some of its conditions, even though the quiddity of the cause be forever unknown. And this is what happens in the case of the separated substances.[14]

Here St. Thomas is pointing out that some things are knowable to us in virtue of themselves, while others are knowable to us, not in virtue of themselves, but only through their effects. We see in geometry, for example, that since the nature of the triangle is knowable to us in virtue of itself, we are able to demonstrate *proper quid* that the interior angles of any triangle are equal to two right angles. St. Thomas probably has the mathematical sciences chiefly in mind as regards the first case, since, in these sciences, *propter quid* demonstrations abound more than in the other speculative sciences.[15]

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[14] ...quaedam res sunt a nobis per se ipsas cognoscibiles, et in talibus manifestandis scientiae speculativae utuntur earum diffinitionibus ad demonstrandum ipsarum proprietates, sicut accidit in scientiis quae demonstrant propter quid. Quaedam vero res sunt, quae non sunt nobis cognoscibiles ex se ipsis, sed per effectus suos; et si quidem effectus sit adaequans causam, ipsa quiditas effectus accipitur ut principium ad demonstrandum causam esse et ad investigandum quiditatem eius, ex qua iterum proprietates eius ostenduntur; si autem sit effectus non adaequans causam, tunc diffinitio effectus accipitur ut principium ad demonstrandum causam esse et aliquas condiciones eius, quamvis quiditas causae sit semper ignota, et ita accidit in substantiis separatis. *In de Trin.*, q. 6, a. 4 *ad 2um*, vol. 50, p. 171.

[15] A comparison of the kinds of demonstrations found in Euclid's *Elements* to the kinds of demonstrations found either in Aristotle's *Physics* or *Metaphysics* seems to bear this out.

Now St. Thomas makes clear that when we consider the things that are knowable to us through their effects, we find that some of these things are knowable to us through an effect which is adequate to its cause, whereas others are knowable to us through an effect which is not adequate to its cause. When this second case obtains, St. Thomas tells us that, through our knowledge of the nature of the effect, we are able to demonstrate both that the cause of the effect exists and what some of the conditions or attributes are which belong to this cause.[16] However, since the effect is not adequate to the power of its cause, we are unable to come to know the nature of the cause from the effect in question. Now it seems that a good example of this kind of reasoning from effect to cause is the one which St. Thomas mentions, namely, our knowledge of separated substances. Thus, we see in the *Prima pars* of the *ST* that St. Thomas is able to demonstrate, through certain effects of God, both that God exists and that certain attributes must belong to Him.[17] Nonetheless, St. Thomas is insistent that, "since we cannot know what God is, but what He is not, we cannot consider in what way God is, but in what way He is not."[18]

What, then, of those causes which are knowable to us through certain adequate effects? As

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[16] At first this point might seem to contradict what was said above regarding "cause" and "caused" being together in our knowledge. For here St. Thomas is clearly stating that we can know that a certain effect exists both before we know what its cause is and even before we know that its cause is. Thus, we know that natural substances exist before we know what their first agent cause is and even before we know that they have a first agent cause. But in reality there is no contradiction between these two points. For what is an effect need not always be considered precisely as an effect. As a result, when what is an effect is considered in itself (i.e., not insofar as it is an effect, but only insofar as it is a certain sort of thing in its own right), it need not be known together with its cause. When, however, what is an effect is considered as an effect, then it must be known together with its cause. And it is the first of these two ways of considering something which is an effect that St. Thomas seems to have in mind here.

[17] *ST* I, qq. 2-11, vol. 4, pp. 27-113.

[18] The complete sentence from which this quote is taken is as follows: "Cognito de aliquo an sit, inquirendum restat quomodo sit, ut sciatur de eo quid sit. Sed quia de Deo scire non possumus quid sit, sed quid non sit, non possumus considerare de Deo quomodo sit, sed potius quomodo non sit." *ST* I, q. 3, *proemium*, vol. 4, p. 35.

is clear from the text, St. Thomas does not provide us with an explicit example of this case at hand.[19] Yet, if we think back to the aforementioned example from Ptolemy, we can see at least something of what St. Thomas has in mind here. Here is the text which we quoted above from Ptolemy together with the way in which he reasons from the phenomena, as effects, to the cause of the phenomena:

> Now that also the earth taken as a whole is sensibly spherical, we could most likely think out in this way. For again it is possible to see that the sun and moon and the other stars do not rise and set at the same time for every observer on the earth, but always earlier for those living towards the orient and later for those living towards the occident. For we find that the phenomena of eclipses taking place at the same time, especially those of the moon, are not recorded at the same hours for everyone – that is, relatively to equal intervals of time from noon; but we always find later hours recorded for observers towards the orient than for those towards the occident. And since the differences in the hours is found to be proportional to the distances between the places, one would reasonably suppose the surface of the earth spherical, with the result that the general uniformity of curvature would assure every part's covering those following it proportionately. But this would not happen if the figure were any other, as can be seen from the following considerations.
>
> For, if it were concave, the rising of the stars would appear first to people towards the occident; and if it were flat, the stars would rise and set for all people together and at the same time; and if it were a pyramid, a cube, or any other polygonal figure, they would again appear at the same time for all observers on the same straight line. But none of these things appears to happen. It is further clear that it could not be cylindrical with the curved surface turned to the risings and settings and the plane bases to the poles of the universe, which some think more plausible. For then never would any of the stars be always visible to any of the inhabitants of the curved surface, but either all the stars would both rise and set for observers or the same stars for an equal distance from either of the poles would always be invisible to all observes. Yet the more we advance towards the north pole, the more the southern stars are hidden and the northern stars appear. So it is clear that here the curvature of the earth covering parts uniformly in oblique directions proves its spherical form on every side. Again, whenever we sail towards mountains or high

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[19] It does not seem unreasonable to think that many, or even most, of the cases of coming to know a cause in this way are to be found in the natural sciences. For, as was noted above, St. Thomas at least suggests that the mathematical sciences are the ones wherein, for the most part, we know certain effects through their proper causes (which are more known to us than are their proper effects). Likewise, it seems to be metaphysics wherein we would arrive at a knowledge of the existence and conditions of certain causes (i.e., separated substances) through effects which are not adequate to these causes. This, then, leaves room for natural science to be the part of speculative philosophy which characteristically reasons from adequate effects to the natures of the proper causes of those effects. See *In de Trin.*, q. 6, a. 1, vol. 50, pp. 159-160.

> places from whatever angle and in whatever direction, we see their bulk little by little increasing as if they were arising from the sea, whereas before they seemed submerged because of the curvature of the water's surface.[20]

This text makes it clear that through our knowledge of the effects which Ptolemy mentions (e.g., the earlier or later rising and setting of the heavenly bodies depending upon one's location, etc.), we are able to come to know quite determinately the nature of the proper cause of these effects (i.e., the spherical shape of the earth). Thus, given Ptolemy's argument, we are able to state that we know that the earth is spherical in shape because of our knowledge of certain effects which result from the earth's spherical shape. But, in addition to this, we are also able to maintain that we know precisely why these same certain effects are as they are. That is, we know that it is because the earth is spherical in shape that the heavenly bodies rise and set earlier or later depending upon how far to the East or West someone is, and so forth. Ptolemy's argument, then, seems to be an example of at least part of what St. Thomas has in mind when he says that "if an effect be adequate to its cause, the very quiddity of the effect is taken as a principle for demonstrating the existence of the cause and for investigating its quiddity, from which, in turn, its properties are shown."[21]

Now with these things in mind, it seems that the question which prompted us to examine the above text from St. Thomas can be answered with the following syllogism:

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[20] Ptolemy, *op. cit.*, Bk. 1, Ch. 4, pp. 8-9.

[21] See footnote 14 above for the fuller text and the reference. Another heavenly example of what St. Thomas has in mind here is given by the Philosopher in *Posterior Analytics*, Bk. 1, Ch. 13, 78a22-79a16. There Aristotle shows that we initially come to know that the planets are nearer to us than the stars since the former are non-twinkling light sources, whereas the latter are twinkling light sources (and, we know from experience that those light sources which are far away twinkle, whereas those that are close do not). But, having seen this, we are in a position to know the effect through its proper cause. That is, while we come to know that the planets are nearer to us than the stars on account of the former's non-twinkling, we see that it is not on account of their non-twinkling that they are nearer to us, but rather the converse (i.e., we see that it is because the planets are nearer to us than the stars that they do not twinkle whereas the stars do twinkle). The waxing of the moon, which Aristotle also mentions in *Posterior Analytics*, Bk. 1, Ch. 13, provides yet another good example of what St. Thomas has in mind here.

> Every case in which the nature of some principled and caused thing is to some extent known to us while the nature(s) of the principles and causes of that same thing are unknown to us is a case in which we must proceed from our knowledge of the nature of the principled and caused thing to a knowledge of the nature(s) of the principles and causes of that same thing.[22]
> But every case in which this substance of this kind becomes that substance of that kind is a case in which the natures of some principled and caused things are to some extent known to us while the nature(s) of the principles and causes of these same things are unknown to us.
> Hence, every case in which this substance of this kind becomes that substance of that kind is a case in which we must proceed from our knowledge of the natures of the principled and caused things to a knowledge of the nature(s) of the principles and causes of these same things.

At this point, we might still wonder how precisely what we have just established applies in particular to our attempt to come to know the nature(s) of the *principia naturae*. For, after all, the example from Ptolemy pertains to the genus of the agent or efficient cause which is a kind of *extrinsic* cause.[23] But we are interested in knowing the natures of the principles and causes *within*

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[22] The major premise in the syllogism takes for granted the general principle that we must proceed from what we know to what we do not know and from what is more known to us to what is less known to us. Further, it should be clear that the order of proceeding, laid down in the major premise, is from what is more known to us but less known simply to what is less known to us but more known simply. For the principled or caused thing is more known to us than are its principles and causes, yet these latter are more known simply than are the thing of which they are the principles and causes.

[23] Indeed, one might wonder similarly about all of the above examples of causes and effects, since they all belong to the genus of the agent or efficient cause. The reason we have used examples from this genus of cause is that the agent is, in some way, the kind of cause which is most known to us. Hence, examples from the genus of agent cause can elucidate certain truths regarding cause and effect better than examples from other genera of causes. Now, while thanks to our common experience, we recognize ourselves to be agents more than any other kind of cause, we are in no way denying here that some other kind of cause, for example, the material cause, is, in some other way, more known to us than the agent cause. Touching on this point, Charles De Koninck writes: "As Russell has repeatedly observed, 'The "efficient" cause is what we should call simply "the cause..."' While it is the one which was first named 'cause' it is, in fact, as Hume's critique has shown, quite difficult to defend outside the domain of human making and acting. But once we have defined cause as 'that upon which something depends in being or becoming', the notion of material cause is the most obvious and certain, such as the wood of a wooden table; then that of form, e.g., the shape of the table; and any critical discussion of causality should begin with these." *The Hollow Universe* (New York: Oxford University Press, 1960), p. 100. Here De Koninck tells us that "any critical discussion" of the causes must begin with the two kinds of causes that we shall examine in detail in chapter six (i.e., the material cause and the formal cause). The movement of the mind from these two kind of causes to the existence of the agent cause is presented *breviter* by St. Thomas in chapter three of the *DPN*. He writes: "Ex dictis igitur patet tria esse naturae principia scilicet materia, forma et privatio. Sed haec non sunt sufficientia ad generationem. Quod enim est in potentia, non potest se reducere ad actum: sicut cuprum quod est potentia idolum,

the very natural substances most known to us which are responsible for the change or transformation of this substance of this kind into that substance of that kind. So, do we need to proceed any differently, if we are wondering about the nature(s) of *intrinsic* and not *extrinsic* principles and causes?

### 5. *Via Resolutionis et Via Compositionis*

What St. Thomas says in the following text bears on the query just raised:

> In the pursuit of our knowledge of composite things, the first work is the way of resolution, namely, that we divide the composite down to indivisible parts. But afterwards the way of composition is necessary whereby from the indivisible principles already known we judge concerning those things which are caused by the principles.[24]

Here the Angelic Doctor helps us to understand that whenever we desire to know what some

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non facit se idolum, sed indiget operante, qui formam idoli extrahat de potentia in actum. Forma etiam non extraheret se de potentia in actum (et loquor de forma generati, quam diximus esse terminum generationis); forma enim non est nisi in facto esse: quod autem operatur est in fieri, idest dum res fit. Oportet ergo praeter materiam et formam esse aliquod principium quod agat, et hoc dicitur esse efficiens, vel movens, vel agens, vel unde est principium motus." Vol., 43, pp. 41-42. See also *De potentia*, q. 5, a. 1, vol. 2, p. 131. Since, however, we have not yet established that matter, form, and privation are the three *principia naturae*, we cannot yet use this universal argument in order to manifest that there must be agent causes.

[24] "...ad cognitionem compositorum primo opus est via resolutionis, ut scilicet dividamus compositum usque ad individua. Postmodum vero necessaria est via compositionis, ut ex principiis indivisibilibus iam notis diiudicemus de rebus quae ex principiis causantur." *In Polit.*, Bk. 1, *capitulum* 1/a, vol. 48, p. A 73. St. Thomas speaks in a similar, but yet more general way, in the following text: "Est autem considerandum quod in nobis est duplex compositio intellectus: una quidem quae pertinet ad inventionem veritatis, alia vero quae pertinet ad iudicium; inveniendo, quidem, quasi congregantes ex multis ad unum procedimus sive multa dicantur diversa sensibilia per quorum experimentum universalem cognitionem accipimus sive multa dicantur diversa signa ex quibus ratiocinando ad talem veritatem pervenimus. Non solum autem huiusmodi multis et divisibilibus procedimus ad unam intelligibilem veritatem cum primo scientiam acquirimus, sed etiam iam scientiam habentes, in ipsis multis vel divisibilibus per quamdam applicationem consideramus quod in universali cognitione tenemus. In iudicio, vero, procedimus ab aliquo communi principio ad praedicta multa et divisibilia sive particularia sui effectus et signa." *In de Div. Nom.*, Ch. 7, *lectio* 2, p. 266 (#711). Given this text (as well as others such as *ST* I, q. 79, a. 8, vol. 5, p. 274), it seems fitting to give the names "*via inventionis*" and "*via judicii*" to the "*via resolutionis*" and "*via compositionis*," respectively. An important article which considers resolution and composition generally in the works of St. Thomas is the following: S. Edmund Dolan, "Resolution and Composition in Speculative and Practical Discourse," *Laval Theologique et Philosophique* 6 (1950), pp. 9-62.

composite thing is in virtue of the nature(s) of principles and causes which are within it, we must travel over, so to speak, two ways or *viae*, namely the *via resolutionis* and the *via compositionis*. We travel over the *via resolutionis* as we come to understand what the indivisible composing parts or principles of the composite thing actually are. After this, we travel over the *via compositionis* insofar as from the principles now known "we judge concerning those things which are caused by the principles."[25]

An example of the way in which these two *viae* are used in order to help us understand a composite thing in terms of the natures of the principles and causes within it can be found in the case of a man who comes to know the art of grammar. That is, when a man begins to learn grammar, he has a general and confused knowledge of what a sentence consists in. Then, through a process of resolution, he comes to see that the sentence as such has various indivisible composing parts or principles, each with a distinct nature. These, of course, are the parts of speech (e.g., noun, verb, pronoun, etc.). But once he has come to see the distinct natures of these various indivisible parts of speech, the man is now able to judge concerning the nature of a sentence as such in a more specific and distinct way than ever before. For now he sees the sentence as something which results from certain fundamental principles and causes which he has a distinct knowledge of.

Now since it is manifest that the natural substances which we desire to know in virtue of the

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[25] It seems worth noting that just as the road from Athens to Thebes and the road from Thebes to Athens are one in subject, but two in account, so also the *via resolutionis* and the *via compositionis* seem to be one in subject, but two in account. Indeed, we can say that the end of the *via resolutionis* is one in subject with the beginning of the *via compositionis* since both of these consist in a certain consideration of the same indivisible composing parts or principles of the composite thing which they make up. However, in the *via resolutionis* these indivisible composing parts or principles are considered *sub ratione finis*, since they are the things at which the process of resolution terminates, whereas in the *via compositionis* they are considered *sub ratione principii*, since they are the principles and causes from which certain effects are seen to follow. And something similar must be said regarding that which is the beginning of the *via resolutionis* and the end of the *via compositionis*.

principles and causes which are within them are in some way composite things, it necessarily follows that we must travel over both the *via resolutionis* and the *via compositionis* in order to so know them.[26] But in order to make what we have just seen somewhat more determinate, let us examine what St. Thomas sets forth in this next text:

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[26] It should be clear that traveling over the *via resolutionis* and the *via compositionis* involves the same general kinds of movements (i.e., first from effect to cause and then from cause to effect) which we encountered in the example from Ptolemy. As such, traveling over these two *viae* seems to involve something similar to what St. Thomas has in mind when he says, "if an effect be adequate to its cause, the very quiddity of the effect is taken as a principle for demonstrating the existence of the cause and for investigating its quiddity, from which, in turn, its properties are shown."

It must be noted, however, that while Ptolemy's argument is clearly a *quia* demonstration from a convertible effect (which kind of argument belongs properly to the third act of reason), it seems that our inquiry here (or travel over the *via resolutionis*) is ordered more to simply understanding what something is (i.e., to understanding what the natures of the inward principles and causes are in the natural substances which are most known to us).

Nevertheless, the act of understanding what something is is often preceded by some sort of discourse of reason. Regarding this, Fr. Thomas McGovern, S. J. states: "Knowledge of the essence involves a kind of discourse beginning from properties and effects known to the senses, and terminating in the apprehension of the essence; the simple apprehension, therefore, is a movement from the known to the unknown and merits the name reason." See his, "The Logic of the First Operation," *Laval Theologique et Philosophique* 12 (1956), p. 61. The text from St. Thomas that Fr. McGovern has in mind here is from *In Sent.*, Bk. 3, d. 35, q. 2, a. 2, qc. 1, vol. 3, p. 1198: "...intellectus secundum suum nomen importat cognitionem pertingentem ad intima rei. Unde cum sensus et imaginatio circa accidentia occupentur quae quasi circumstant essentiam rei, intellectus ad essentiam ejus pertingit. Unde secundum philosophum, objectum intellectus est quid. Sed in apprehensione hujus essentiae est differentia. Aliquando enim apprehenditur ipsa essentia per seipsam, non quod ad eam ingrediatur intellectus ex ipsis quae quasi circumvolvuntur ipsi essentiae; et hic est modus apprehendendi substantiis separatis; unde intelligentiae dicuntur. Aliquando vero ad intima non pervenitur nisi per circumposita quasi per quaedam ostia; et hic est modus apprehendendi in hominibus, qui ex effectibus et proprietatibus procedunt ad cognitionem essentiae rei. Et quia in hoc oportet esse quemdam discursum; ideo hominis apprehensio ratio dicitur, quamvis ad intellectum terminetur in hoc quod inquisitio ad essentiam rei perducit. Unde si aliqua sunt quae statim sine discursu rationis apprehendantur, horum non dicitur esse ratio, sed intellectus; sicut principia prima, quae quisque statim probat audita. Primo ergo modo intellectus potentia est; sed secundo modo accipiendo, habitus principiorum dicitur." Commenting on this, Christopher Decaen says: "This *discursus*, or reasoning, would materially belong to the third operation of the intellect, but the induction in which it terminates is not simply reducible to the third operation the way knowledge of the conclusion of a syllogism is, but formally belongs to the first operation of the intellect." From his, "The Impossibility of Action at a Distance," in *Wisdom's Apprentice: Thomistic Essays in Honor of Lawrence Dewan, O.P.*, ed. P. Kwasniewski (Washington, D.C.: CUA Press, 2007), p. 188

Another essential text on this matter that we should bear in mind, is from *ST* II-II, q. 8, a. 1, vol. 8, p. 66. The relevant portion reads: "...dicendum quod nomen intellectus quandam intimam cognitionem importat, dicitur enim intelligere quasi intus legere. Et hoc manifeste patet considerantibus differentiam intellectus et sensus, nam cognitio sensitiva occupatur circa qualitates sensibiles exteriores; cognitio autem intellectiva penetrat usque ad essentiam rei, obiectum enim intellectus est quod quid est, ut dicitur in III de anima. Sunt autem multa genera eorum quae interius latent, ad quae oportet cognitionem hominis quasi intrinsecus penetrare. Nam sub accidentibus latet natura rerum substantialis, sub verbis latent significata verborum, sub similitudinibus et figuris latet veritas figurata: res etiam intelligibiles sunt quodammodo interiores respectu rerum sensibilium quae exterius sentiuntur, et in causis latent effectus et e converso. Unde respectu horum omnium potest dici intellectus."

> It must be said that in any knowledge one must consider two things, namely the beginning and the end. The beginning pertains to apprehension, but the end to judgement, for there knowledge is perfected. The beginning, therefore, of any knowledge that we have is sense experience, since from the apprehension of sense experience the apprehension of the imagination comes forth, which is "a motion coming to be from sense," as the Philosopher says; from which, furthermore, the intellectual apprehension comes forth in us, since phantasms are as objects of the intellectual soul, as is clear from III *On the Soul*. But the end of knowledge is not always the same. For sometimes it is in sense experience, sometimes in the imagination, but sometimes only in the intellect. For sometimes the properties and accidents of a thing which are known from sense experience sufficiently express the nature of the thing. And in such a case it is necessary that the judgement concerning the nature of the thing which the intellect makes be conformed to those things which sense experience makes known about the thing. And all natural things, which are determined to sensible matter, are things of this sort. Therefore, in natural science knowledge must be terminated at sense experience such that we judge about natural things according to the way in which sense experience makes them known, as is clear in III *De caelo*. And he who neglects sense experience in the study of natural things falls into error. And natural things are those things which are bound up with sensible matter and motion both according to being and according to consideration.[27]

This text seems to be concerned primarily with the different termini to which we resolve our judgements in the three speculative sciences. While the subject matters of all three of these sciences are in some way rooted in our sense experience, these subject matters are not all related to sensible matter (i.e., bodily matter subject to sensible qualities) in the same way.[28] For the subject matter of

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[27] Dicendum quod in qualibet cognitione duo est considerare, scilicet principium et terminum. Principium quidem ad apprehensionem pertinet, terminus autem ad iudicium; ibi enim cognitio perficitur. Principium igitur cuiuslibet nostrae cognitionis est in sensu, quia ex apprehensione sensus oritur apprehensio phantasiae, quae est *motus a sensu factus*, ut dicit philosophus, a qua iterum oritur apprehensio intellectiva in nobis, cum phantasmata sint intellectivae animae ut obiecta, ut patet in III de anima.

Sed terminus cognitionis non semper est uniformiter: quandoque enim est in sensu, quandoque in imaginatione, quandoque autem in solo intellectu. Quandoque enim proprietates et accidentia rei, quae sensu demonstrantur, sufficienter exprimunt naturam rei, et tunc oportet quod iudicium de rei natura quod facit intellectus conformetur his quae sensus de re demonstrat. Et huiusmodi sunt omnes res naturales, quae sunt determinatae ad materiam sensibilem, et ideo in scientia naturali terminari debet cognitio ad sensum, ut scilicet hoc modo iudicemus de rebus naturalibus, secundum quod sensus eas demonstrat, ut patet in III caeli et mundi; et qui sensum neglegit in naturalibus, incidit in errorem. Et haec sunt naturalia quae sunt concreta cum materia sensibili et motu et secundum esse et secundum considerationem. *In de Trin.*, q. 6, a. 2.

[28] *ST* I, q. 85, a. 1 *ad 2um*, vol. 5, p. 331.

natural philosophy can neither be nor be defined apart from sensible matter. By contrast, the subject matter of mathematics cannot be apart from sensible matter, although it is defined apart from it. And the subject matter of metaphysics is both able to be and is defined apart from sensible matter.[29] Consequently, when we resolve our judgements in natural philosophy, our resolution terminates at what is known in our sense experience. Similarly, when we resolve our judgements in mathematics, we resolve them to what is grasped by the imagination. And, finally, in metaphysics our resolution terminates at what is understood in the intellect alone.

Now St. Thomas's teaching here does bear on our present consideration insofar as the subject of natural philosophy, that is, mobile being, cannot be understood as such apart from various sensible attributes or properties (e.g., becoming). As a result, when the natural philosopher analyzes mobile being in to its inward principles and causes, he must do so through carefully attending to these same

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[29] Regarding these distinctions, see the following text from the beginning of *In Phys.*, Bk. 1, *lectio* 1, vol. 2, p. 4: "Quia liber physicorum, cuius expositioni intendimus, est primus liber scientiae naturalis, in eius principio oportet assignare quid sit materia et subiectum scientiae naturalis. Sciendum est igitur quod, cum omnis scientia sit in intellectu, per hoc autem aliquid fit intelligibile in actu, quod aliqualiter abstrahitur a materia; secundum quod aliqua diversimode se habent ad materiam, ad diversas scientias pertinent. Rursus, cum omnis scientia per demonstrationem habeatur, demonstrationis autem medium sit definitio; necesse est secundum diversum definitionis modum scientias diversificari. Sciendum est igitur quod quaedam sunt quorum esse dependet a materia, nec sine materia definiri possunt: quaedam vero sunt quae licet esse non possint nisi in materia sensibili, in eorum tamen definitione materia sensibilis non cadit. Et haec differunt ad invicem sicut curvum et simum. Nam simum est in materia sensibili, et necesse est quod in eius definitione cadat materia sensibilis, est enim simum nasus curvus; et talia sunt omnia naturalia, ut homo, lapis: curvum vero, licet esse non possit nisi in materia sensibili, tamen in eius definitione materia sensibilis non cadit; et talia sunt omnia mathematica, ut numeri, magnitudines et figurae. Quaedam vero sunt quae non dependent a materia nec secundum esse nec secundum rationem; vel quia nunquam sunt in materia, ut Deus et aliae substantiae separatae; vel quia non universaliter sunt in materia, ut substantia, potentia et actus, et ipsum ens. De huiusmodi igitur est metaphysica: de his vero quae dependent a materia sensibili secundum esse sed non secundum rationem, est mathematica: de his vero quae dependent a materia non solum secundum esse sed etiam secundum rationem, est naturalis, quae physica dicitur. Et quia omne quod habet materiam mobile est, consequens est quod ens mobile sit subiectum naturalis philosophiae. Naturalis enim philosophia de naturalibus est; naturalia autem sunt quorum principium est natura; natura autem est principium motus et quietis in eo in quo est; de his igitur quae habent in se principium motus, est scientia naturalis."

sensible attributes or properties.[30] Furthermore, when he arrives at an understanding of the inward principles and causes of mobile being, he must judge that both mobile being and the various sensible attributes and properties that belong to it to result in some way from these same inward principles and causes.[31]

In addition, this text sheds some light on what St. Thomas said above regarding the *via resolutionis* and the *via compositionis* and, in so doing, helps to make it manifest that both the beginning of the *via resolutionis* and the end of the *via compositionis* must consist in nothing other than certain sensible attributes or properties of the natural substances which are most known to us.[32] In other words, as Ptolemy (1) moved from certain things which are known to us from our sense experience (i.e., the earlier or later rising and setting of the heavenly bodies, etc.) to a discovery of the nature of the cause which accounts for these things (i.e., the spherical shape of the earth) and, thereafter, (2) made the judgement, from the point of view of the nature of the cause (i.e., the

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[30] Regarding the natural philosopher's inquiry into the principles and causes of the subject of his science, St. Thomas says: "...quaelibet scientia debet inquirere principia et causas sui subjecti, quae sunt ejus inquantum hujusmodi..." *In Metaphys.*, Bk. 6, *lectio* 1, p. 351 (#1145); and, "considerandum est quod subiectum alicuius scientiae duplices partes habere potest, scilicet partes ex quibus componitur sicut ex primis, ut dictum est, idest ipsa principia subiecti, et partes subiectivas. Et quamvis de utrisque partibus possit intelligi quod hic dicitur, tamen magis videtur esse intelligendum de primo genere partium. In qualibet enim scientia sunt quaedam principia subiecti, de quibus est prima consideratio; sicut in scientia naturali de materia et forma, et in grammatica de literis. Est etiam in qualibet scientia aliquid ultimum, ad quod terminatur consideratio scientiae, ut scilicet passiones subiecti manifestentur." *In Post. Ana.*, Bk. 1, *lectio* 41, vol. 1*2, p. 154.

[31] It must be noted that in this essay we are principally concerned with knowing the natures of the inward principles and causes of natural substance. "Natural substance" names an account which is different from the account that is named by "mobile being," the subject of natural philosophy. Regarding the latter, see Cajetan's *De Subjecto Naturalis Philosophiae*, *Supplement du Laval Theologique et Philosophique*, vol. 1 (1939), pp. 1-20.

[32] At this point, we can see more distinctly that just as the end of the *via resolutionis* and the beginning of the *via compositionis* are one in subject but two in account, so too the beginning of the *via resolutionis* and the end of the *via compositionis* are one in subject but two in account. At this point in the discussion, the asymmetry between these two *viae* should not surprise us. For the *via resolutionis* proceeds from what is more known to us to what is more known simply speaking, whereas the *via compositionis* proceeds from what is more known simply speaking to what is more known to us, and it is clear that for the most part what is more known to us is not the same as what is more known simply speaking.

spherical shape of the earth), that the certain things which are known to us from our sense experience (i.e., the earlier or later rising and setting of the heavenly bodies, etc.) are really the proper effects which follow from the nature of the cause which we have discovered, so too in our attempt to know the nature(s) of the principles and causes which are within the natural substances which are most known to us, we must, in a similar way, (1) move from certain attributes or properties, belonging to these natural substances, which are known to us from our sense experience to a discovery of the nature(s) of the principles and causes within the same natural substances which account for these attributes or properties and, thereafter, (2) judge, from the point of view of the nature(s) of these inward principles and causes, that these same attributes and properties which are known to us from our sense experience are really the proper effects which follow from the nature(s) of these inward principles and causes which we will have discovered. So, just as, with Ptolemy's argument, we came to know what is more knowable simply speaking (i.e., the spherical shape of the earth) by depending on something which is more known to us, namely, the existence and nature of its proper effects (known to us from our sense experience), so, in a similar way, we shall come to understand what is more knowable simply speaking (i.e., the nature[s] of the principles and causes within the natural things most known to us) by depending on something which is more known to us, namely, the existence and natures of the proper effects (known to us from our sense experience) of these same inward principles and causes.[33]

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[33] In his *In de Trin.*, q. 6, a. 1, vol. 50, pp. 159-160 , St. Thomas distinguishes three senses in which some process by which we proceed in the sciences may be called "rationabilis." The third of these is relevant here: "Tertio modo dicitur aliquis processus rationalis a potentia rationali, in quantum scilicet in procedendo sequimur proprium modum animae rationalis in cognoscendo, et sic rationabilis processus est proprius scientiae naturalis. Scientia enim naturalis in suis processibus servat proprium modum rationalis animae quantum ad duo. Primo quantum ad hoc, quod sicut anima rationalis a sensibilibus, quae sunt nota magis quoad nos, accipit cognitionem intelligibilium, quae sunt magis nota secundum naturam, ita scientia naturalis procedit ex his, quae sunt nota magis quoad nos et minus nota secundum naturam, ut patet in I physicorum, et demonstratio, quae est per signum vel

The next question which we need to ask, then, is this: What precisely are the sensible attributes or properties which belong to the natural substances which are most known to us from which we must proceed in order to discover the nature(s) of the principles and causes which are within these same natural substances? Or, better, what are the sensible proper effects of the *principia naturae* from which we must proceed in order to discover the nature(s) of these same *principia naturae*? There are, of course, the sensible attributes or properties of these natural substances which were mentioned earlier in this chapter, namely, the substantial unity of the substances involved in substantial becoming, the differences in kind amongst these substances, and the reality of substantial becoming itself. *Prima facie* these would seem to be precisely the attributes or properties known to us from our sense experience from which we should begin our investigation of the nature(s) of the principles and causes within the natural substances which are most known to us. This seems especially so given that it was these three things which in the first place stirred us to ask the question, *Quid sint principia naturae*? In other words, it was precisely the substantial unity of the substances involved in substantial becoming, the differences in kind amongst these substances, and the reality of substantial becoming itself which we initially recognized to be the proper effects of the inward principles and causes which we, in turn, named the "*principia naturae*."

However, as we saw in chapter two, there are many who have attempted to answer the

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effectum, maxime usitatur in scientia naturali. Secundo, quia cum rationis sit de uno in aliud discurrere, hoc maxime in scientia naturali observatur, ubi ex cognitione unius rei in cognitionem alterius devenitur, sicut ex cognitione effectus in cognitionem causae. Et non solum proceditur ab uno in aliud secundum rationem, quod non est aliud secundum rem, sicut si ab animali procedatur ad hominem. In scientiis enim mathematicis proceditur per ea tantum, quae sunt de essentia rei, cum demonstrent solum per causam formalem; et ideo non demonstratur in eis aliquid de una re per aliam rem, sed per propriam diffinitionem illius rei. Etsi enim aliquae demonstrationes dentur de circulo ex triangulo vel e converso, hoc non est nisi in quantum in circulo est potentia triangulus et e converso. Sed in scientia naturali, in qua fit demonstratio per causas extrinsecas, probatur aliquid de una re per aliam rem omnino extrinsecam. Et ita modus rationis maxime in scientia naturali observatur, et propter hoc scientia naturalis inter alias est maxime hominis intellectui conformis. Attribuitur ergo rationabiliter procedere scientiae naturali, non quia ei soli conveniat, sed quia ei praecipue competit."

question, *Quid sint principia naturae*?, who have ended up denying that these attributes or properties just mentioned in truth belong to the natural substances which are most known to us. Hence, it seems that if we are to use these attributes or properties as beginnings from which to come to know the nature(s) of the inward principles and causes of the natural substances which are most known to us, we must first make clear that these attributes or properties are indeed known to us from our sense experience. For if we can do this, then, *contra* those who deny that these attributes or properties just mentioned truly belong to the natural substances which are most known to us, we shall be able to use these attributes or properties as firm beginnings from which to proceed to a knowledge of the nature(s) of the inward principles and causes of these same natural substances.

## 6. Résumé

At the beginning of this chapter, it was said that in order to determine the proper *modus procedendi* required in order to answer the question, *Quid sint principia naturae*?, we needed to answer these two questions: (1) How are we to proceed to knowledge of the nature(s) of the *principia naturae*?, and (2) What must the character of our first knowledge of these principles be? In response to the second of these questions, we have seen that the character of our first knowledge of the principles and causes within the natural substances most known to us must be most general in nature. Further, we have seen that it is only after knowing the nature(s) of these principles and causes in a most general way that we will be able to attempt to come to know the nature(s) of these same principles and causes in a more specific way.

In answer to the first of these questions, we have observed that in order to proceed to a knowledge of the nature(s) of the principles and causes within the natural substances which are most

known to us, we must follow what St. Thomas has termed the *via resolutionis* and the *via compositionis* which begin and end, respectively, with certain sensible attributes or properties of these same natural substances. Thus, it is necessary for us to come to understand what is more knowable simply speaking (i.e., the nature[s] of the principles and causes within the natural things most known to us) by depending on something which is more known to us, namely, the existence and natures of the proper effects (known to us from our sense experience) of these same inward principles and causes.

Putting this together with our answer to the other question, we can say, then, that the proper *modus procedendi* which must be followed in order to answer the question, *Quid sint principia naturae*?, is this: Following the *via resolutionis*, we must first of all proceed from certain sensible attributes or properties, common to the natural substances which are most known to us, to a most general knowledge of the nature(s) of the indivisible composing parts or principles (i.e., the inward principles and causes or the *principia naturae*) of these same natural substances. Thereafter, following the *via compositionis*, we must judge, from the point of view of the nature(s) of these inward principles and causes, that these same attributes and properties which are known to us from our sense experience are really the proper effects which follow from the nature(s) of these inward principles and causes which we will have discovered thanks to the *via resolutionis*.

## Chapter Four: A Defense of Three Beginnings

Towards the end of the last chapter we observed that if we are to answer the question, *Quid sint principia naturae*?, while following the proper *modus procedendi* established in that same chapter, we must locate certain sensible attributes or properties which belong to the natural substances which are most known to us from which we can come to know the nature(s) of the inward principles and causes of these same natural things. Further, we observed that the sensible attributes or properties which seem to be the most natural candidates for this role, so to speak, are the very attributes or properties which stirred us to ask the question, *Quid sint principia naturae*?, in the first place, namely, the substantial unity of the substances involved in substantial becoming, the differences in kind amongst the substances involved in substantial becoming, and the reality of substantial becoming itself.

However, we saw in chapter two that many who attempt to answer the question, *Quid sint principia naturae*?, finally deny that the attributes or properties just mentioned actually belong to the natural substances which are most known to us. As a result, it seems right to say that if we are to use these attributes or properties as beginnings from which to come to know what the nature(s) of the inward principles and causes of the natural substances most known to us are, we must first make clear that they are indeed known to us from our sense experience. For if we can do this, then, *contra* those who deny that these attributes or properties truly belong to the natural substances in question, we shall be able to use these attributes or properties as firm beginnings from which to proceed to a knowledge of the nature(s) of the inward principles and causes of the natural substances which are most known to us.

Accordingly, the end of this chapter is to manifest the fact that, thanks to our sense

experience, we indeed know that the natural substances which are most known to us are (1) undivided substances[1] (2) of really different kinds (3) which are involved in substantial becoming (i.e., either as that to which substantial becoming is attributed or as that at which substantial becoming terminates). Now in order to achieve this end, we shall do three things here: (1) make clear what we must mean when we say that these three things are "known to us from our sense experience" or are "sensible" in some way, (2) elucidate how we might defend our knowledge of these three things by looking back to certain aspects of our common experience, and (3) raise and respond to three objections which might reasonably be brought against what we shall set forth here.

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[1] Here we shall merely attempt to manifest the fact that the natural substances which are most familiar to us are indeed undivided substances. Now since all of the thinkers in chapter two, whose positions finally denied this, granted both that substances do in fact exist and that we can know these substances in some measure, we shall not attempt to make clear here either that substances exist or that we can know them in some measure. Rather, we shall merely attempt to refute these thinkers' claim that the only undivided substances which exist are the elements.

The following text from Richard Connell shows how one might defend the existence of substances against those who would deny them: "Having touched on the nature of properties, we must now ask about the subject in which they exist. If shape, for instance, exists in another as in a subject, then does the subject too exist in another as in a subject? It might very well, for shape exists in a magnitude and motion in a shaped magnitude. But then how far can this dependence on a subject go? Does the second subject exist in another, and that in another ad infinitum? The regress, however, cannot go on infinitely; hence we must infer that something exists that does not require a subject, and we call this "substance." Substance, then, is that which exists in itself (or by itself) and not in another as in a subject. Plainly this is a minimal notion which does no more than delineate a basic distinction implicitly recognized on the basis of ordinary experience.

"The argument above concludes to the existence of a substance by denying an infinite regress; yet even were that to be disputed, the reality of substance is evident. We know empirically that things exist separately from each other. Chipmunks are separate from and independent of black bears and oak trees; the earth is separate from and independent from the moon, and so on. Again we ourselves are the most evident instances, for we do not reside in the earth, the atmosphere, or any other reality as in a subject. This means that we as well as other things are either substances or aggregates of them. To repeat the point: no observation or other kind of evidence permits us to maintain that a man is related to a horse or any other thing the way shape is to magnitude or motion to a billiard ball. It seems, then, that substance is a reality which plays the role of substratum; it 'stands under' properties." See Connell's *Substance and Modern Science* (Houston, TX: Center for Thomistic Studies, 1988), pp. 12-13. On this same topic see also: Richard Connell, "An Empirical Consideration of Substance," *Laval Theologique et Philosophique*, 34 (1978): p. 239 as well as John F. X. Knasas, *Being and Some Twentieth Century Thomists* (New York: Fordham University Press, 2003), pp. 11-12.

## 1. Sensible *Per Se* & Sensible *Per Accidens*

Now in order to make clear what we must have in mind when we say that these facts are "known to us from our sense experience" or are, in some way, "sensible," we must first lay out the different meanings of the name, "sensible." Aristotle does precisely this in the sixth chapter of the second book of *On the Soul*. There he writes:

> "The sensible" is said in three ways, two of which we say are sensed in virtue of themselves, while one is sensed accidentally. Of the two, one is proper to each single sense, the other common to all.
>
> I call "proper" what cannot be sensed by another sense, and about which it cannot err, as sight is of colour, hearing of sound, taste of flavour, while touch, indeed, has [reference to] many differences. But each sense discerns these things, and does not err that this is colour nor that it is sound, but [about] what or where the coloured is, or what or where the sounding is. Such things, therefore, are called the proper sensibles of each [sense].
>
> The common sensibles are motion, rest, number, shape, magnitude. For such things are proper sensibles of no one [sense], but are common to all. For a certain motion is a sensible for touch and for sight.
>
> A sensible is called accidental, e.g., if the white is the son of Diares. For it senses this accidentally, because this happens to be white, which is sensed. Whence, as such, no sense suffers from this sensible. Of what are sensibles in virtue of themselves, the proper sensibles are properly sensibles, and is that for which the substance of each sense is naturally apt.[2]

Here it is clear that Aristotle is distinguishing three chief meanings of the name, "sensible." For he distinguishes the proper sensibles from the common sensibles and, then in turn, these two (both of which are sensible *per se*) from those things which are sensible *per accidens*. Or, to bring it more to the level of particulars, we readily say that color, sound, odor, flavor, and the various tangibles

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[2] 418a11-27. A question that has arisen amongst scholars is whether our grasp of what is sensible *per accidens* truly counts as a kind of sensation for Aristotle. Although we are not primarily concerned with this question here (since we are more focused on St. Thomas understanding of the matter), the following works are noteworthy: Irving Block, "Aristotle and the Physical Object," *Philosophy and Phenomenological Research* 21 (1960), pp. 93-101 and Deborah Modrak, *Aristotle: The Power of Perception* (Chicago: University of Chicago Press, 1987). For a recent work on St. Thomas's understanding of sensation *per accidens*, see Robert Pasnau, *Thomas Aquinas on Human Nature: A Philosophical Study of* Summa theologiae Ia 75-89 (Cambridge: Cambridge University Press, 2002).

(e.g., hot, cold, hard, soft, etc.) are "sensible"; we also say that motion, rest, number, shape, and magnitude are "sensible"; furthermore, we say that Mr. Smith, Mrs. Smith, and baby Smith are "sensible."

However, what we mean by "sensible" differs depending on which of these three kinds of things we have in mind. For in the first case (i.e., with the proper sensibles), we name things "sensible"which in virtue of themselves and before anything else affect or act on our external senses. In the second case (i.e., with the common sensibles), we call things "sensible" which in virtue of themselves, but only through the proper sensibles, affect or act on our external senses. Finally, in the third case (i.e., with the *per accidens* sensibles), we name things "sensible" which do not in virtue of themselves affect or act on our external senses at all.[3]

Thus, we may rightly ask: Why are Mr. Smith, Mrs. Smith, and baby Smith said to be "sensible" at all? Addressing this question, St. Thomas writes:

> It must be known that in order for something to be sensible *per accidens*, it is first of all required that it happen to what is sensible *per se*, as when being a man happens to white and when being sweet happens to it. Second, it is necessary that it be apprehended by the one sensing. For if it happened to the sensible, but were hidden from the one sensing, it would not be said to be sensed *per accidens*. It is necessary,

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[3] The following text from St. Thomas helps to elucidate these matters: "...dicendum quod magnitudo et figura et huiusmodi, quae dicuntur communia sensibilia, sunt media inter sensibilia per accidens et sensibilia propria, quae sunt obiecta sensuum. Nam sensibilia propria primo et per se immutant sensum; cum sint qualitates alterantes. Sensibilia vero communia omnia reducuntur ad quantitatem. Et de magnitudine quidem et numero, patet quod sunt species quantitatis. Figura autem est qualitas circa quantitatem; cum consistat ratio figurae in terminatione magnitudinis. Motus autem et quies sentiuntur, secundum quod subiectum uno modo vel pluribus modis se habet secundum magnitudinem subiecti vel localis distantiae, quantum ad motum augmenti et motum localem; vel etiam secundum sensibiles qualitates, ut in motu alterationis, et sic sentire motum et quietem est quodammodo sentire unum et multa. Quantitas autem est proximum subiectum qualitatis alterativae, ut superficies coloris. Et ideo sensibilia communia non movent sensum primo et per se, sed ratione sensibilis qualitatis; ut superficies ratione coloris. Nec tamen sunt sensibilia per accidens, quia huiusmodi sensibilia aliquam diversitatem faciunt in immutatione sensus. Alio enim modo immutatur sensus a magna superficie, et a parva, quia etiam ipsa albedo dicitur magna vel parva, et ideo dividitur secundum proprium subiectum." *ST* I, q. 78, a. 3 *ad* 2*um*, vol. 5, p. 254.

It must be noted that just because the *per accidens* sensibles do not in virtue of themselves affect or act on the external senses, it does not follow that there is not some power of the soul which they do not affect or act on in virtue of themselves.

therefore, that it be known *per se* by some other knowing power belonging to the one sensing. And this, indeed, is either another sense, or the intellect, or the cogitative power, or the estimative power. Now I say that it is another sense when, for example, we say that the sweet is visible *per accidens* insofar as sweet happens to white, which is apprehended by sight, and sweetness itself it known *per se* by some other sense, namely taste.

But, properly speaking, this is not universally sensible *per accidens*, but visible *per accidens*, and sensible *per se*. Therefore, what is not known by a proper sense, if it be something universal, is apprehended by the intellect. Nevertheless, not everything which can be apprehended by the intellect in the sensible thing can be called "sensible *per accidens*," but [only] what is apprehended by the intellect as soon as the sensible thing is grasped. For example, as soon as I see someone speaking, or moving himself, I apprehend his life through my intellect, whence I am able to say that I see that he is alive. But if it is apprehended in a singular, as when, seeing a colored thing, I perceive this man or this animal, an apprehension of this sort comes to be in man through the cogitative power, which is also called "particular reason," since it collates individual intentions just as universal reason collates accounts of universals.[4]

This text makes it clear that we are justified in saying that Mr. Smith, Mrs. Smith, and baby Smith

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[4] Sciendum est igitur, quod ad hoc quod aliquid sit sensibile per accidens, primo requiritur quod accidat ei quod per se est sensibile, sicut accidit albo esse hominem, et accidit ei esse dulce. Secundo requiritur, quod sit apprehensum a sentiente: si enim accideret sensibili, quod lateret sencientem, non diceretur per accidens sentiri. Oportet igitur quod per se cognoscatur ab aliqua alia potentia cognoscitiva sencientis, et hec quidem vel est alius sensus, vel est intellectus, vel vis cogitativa, aut vis estimativa. Dico autem quod est alius sensus, sicut si dicamus, quod dulce est visibile per accidens inquantum dulce <accidit albo quod apprehenditur visu, per se autem dulce> apprehenditur gustu. Sed, ut proprie loquamur, hoc non est universaliter sensibile per accidens, sed per accidens *visibile*, sensibile autem per se.

Quod ergo sensu proprio non cognoscitur, si sit aliquid universale, apprehenditur intellectu. Non tamen omne quod intellectu apprehendi potest in re sensata, potest *dici* sensibile per accidens, sed quod statim ad occursum rei sensatae apprehenditur intellectu, sicut statim cum video aliquem loquentem, vel movere seipsum, apprehendo per intellectum vitam eius, unde possum dicere quod video eum vivere. Si vero apprehendatur in singulari, ut puta <si> cum video coloratum, percipio hunc hominem vel hoc animal, huiusmodi quidem apprehensio in homine fit per vim cogitativam, quae dicitur etiam ratio particularis, eo quod est collativa intentionum individualium, sicut ratio universalis est collativa rationum universalium. *In de Anima*, Bk. 2., *capitulum* 13, vol. 45, 1, pp. 120-121.

On this matter Charles De Koninck adds: "Knowledge of an incidentally sensible object of this kind must accompany every sensation, since all *per se* sensibles are at once perceived as belonging to something that is not *per se* sensed; and this something, unlike the things we sense *per se*, is never attributable to anything else. When we see that Socrates is white, or hear him talking, we are aware that whiteness is in him, and talking one of his activities, but Socrates himself we do not attribute to anything else.

Notice also that, when it is asserted that Socrates is *per se* known to the mind and only *per accidens* to the senses, this should not be interpreted to mean that *per se* sensibles are only *per accidens* attained by the mind. The mind extends *per se* to what is *per se* sensible to the senses and to what is sensed by them *per accidens*, grasping both one and the other as connected *per se*, for it is not *per accidens* that Socrates has shape and colour. In a similar way the mind apprehends speech both as a series of sounds and as possessed of meaning." See his, "Abstraction from Matter," p. 172.

are "sensible" and, more specifically, "sensible *per accidens*." For St. Thomas points out here that whatever both happens to something which is *per se* sensible and which is itself known *per se* as soon as the *per se* sensible quality to which it happens is sensed or perceived is something which we properly call "sensible *per accidens*." But Mr. Smith, Mrs. Smith, and baby Smith are things of this sort. For, as soon as we sense some of the *per se* sensible qualities which belong to these three substances, we also apprehend *per se* something of these substances themselves. Or, applying here what St. Thomas says in another text, when we perceive the sensible qualities of Mr. Smith, Mrs. Smith, and baby Smith, we apprehend these substances in virtue of themselves "without hesitation and without discourse."[5] Hence, Mr. Smith, Mrs. Smith, and baby Smith are properly called "sensible *per accidens*."[6]

St. Thomas's text helps us to see, furthermore, that many of our knowing powers may be

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[5] The full text is as follows: "...sensu corporali aliquid sentitur dupliciter: uno modo per se, alio modo per accidens. Per se quidem sentitur illud quod per se passionem sensui corporali inferre potest. Per se autem potest aliquid passionem inferre aut sensui inquantum est sensus, aut huic sensui inquantum est hic sensus. Quod autem hoc secundo modo infert per se passionem sensui, dicitur sensibile proprium; sicut color respectu visus, et sonus respectu auditus. Quia autem sensus inquantum est sensus, utitur organo corporali, non potest in eo aliquid recipi nisi corporaliter; cum omne quod recipitur in aliquo, sit in eo per modum recipientis; et ideo omnia sensibilia inferunt passionem sensui inquantum est sensus, secundum quod habent magnitudinem; et ideo magnitudo, et omnia consequentia, ut motus et quies et numerus, et hujusmodi, dicuntur sensibilia communia per se tantum. Per accidens autem sentitur illud quod non infert passionem sensui neque inquantum est sensus, neque inquantum est hic sensus; sed conjungitur his quae per se sensui inferunt passionem; sicut Socrates, et filius Diarii, et amicus, et alia hujusmodi: quae per se cognoscuntur in universali intellectu; in particulari autem in virtute cogitativa in homine, aestimativa autem in aliis animalibus. Hujusmodi autem tunc sensus exterior dicitur sentire, quamvis per accidens, quando ex eo quod per se sentitur, vis apprehensiva, cujus est illud cognitum per se cognoscere, statim sine dubitatione et discursu apprehendit; sicut videmus aliquem vivere ex hoc quod loquitur. Quando autem aliter se habet, non dicitur illud sensus videre, etiam per accidens." *In Sent.*, Bk. 4, d. 49, q. 2, a. 1, quoted from *Supplementum tertiae partis*, vol. 12, p. 222.

[6] Speaking of substantial natures and substantial being, Fr. Lawrence Dewan notes: "...they are only "sensible" if this word is used in a *wide* sense, to include *what immediately occurs* to the *intelligence* on the basis of experience of sensible things in sense cognition. We *see* and *hear* that-which-is-colored and that-which-is-sounding, a particular sensible unity. But the *substance* 'dawns on' the mind, the intellect, because of such sensible experience." From, *Form and Being*, pp. 117-118.

involved in judgements which we make concerning what is sensible *per accidens*.[7] For example, if, while looking at Mr. Smith, we make a judgement such as, "Mr. Smith is a man," or "Mr. Smith is a living being," or "Mr. Smith is a substance," this judgement is an act of reason which depends on acts of both the external and internal senses. This judgement is clearly an act of reason since it involves the predication of a universal predicate of some subject. It depends on the external senses (i.e., at least the sense of sight) since the subject of which the predicate is affirmed is a sensible substance which we are sensing here and now. Finally, this judgement also depends on the internal senses (especially the cogitative power) since, as St. Thomas says later in *In de Anima* Bk. 2, *capitulum* 13, "the cogitative power apprehends the individual as existing under a common nature...insofar as it is united to the intellect in the same subject; hence, it knows this man insofar as it is this man, and this wood insofar as it is this wood."[8]

With these points in mind, we shall now endeavor to make clear, on the one hand, that our judgements concerning the substantial unity of the natural substances which are most known to us, their differences in kind, and the substantial becomings which they are involved in are either judgements about what is sensible *per accidens* or are judgements about what is rooted in what is sensible *per accidens*, and, on the other hand, that, because these judgements are firmly based in our

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[7] Robert Pasnau notes this point as well. Thinking in terms of the example that St. Thomas gave above, which involves our experiencing someone speaking and moving himself from which we make the judgement, "He is alive," Pasnau states: "Even when such intellectual cognition does occur with sensation in the way Aquinas here describes, it will not always be a case of the intellect's first, simple operation. The example Aquinas offers, in fact, is a case of a composite judgement, where the attribute of *living* is connected to a particular person. This would count as the second operation of intellect. So the first operation of intellect cannot be reduced to a kind of sensation *per accidens*." See his, *Thomas Aquinas on Human Nature*, p. 274.

[8] ...cogitativa apprehendit individuum, ut existens sub natura communi, quod contingit ei, inquantum unitur intellectivae in eodem subiecto, unde cognoscit hunc hominem prout est hic homo, et hoc lignum prout est hoc lignum. Vol. 45, 1, p. 122.

common experience of the natural world, we are justified in thinking that these same judgements are in fact true. Regarding the latter point, Fr. Dewan writes:

> It is the metaphysician's business to "double back" on what seem to be natural concepts and judgements in order to show that they are not all "flat earth" errors. We surely do conceive of things as many in kind and number. Philosophers (or scientists) very early on proved unable to accept this. Aristotle's work, in part, is aimed at honoring the original natural judgement. We ourselves can exploit various advances in observational technique to confirm it. While far from admitting that the natural judgement is a mistake, we do, nevertheless, insist that, for its well-being, it needs the advantages of reflection.[9]

Although here we shall not appeal to "advances in observational technique" in order to confirm our judgements regarding the aforementioned matters, nevertheless, we shall attempt to "double back" to our common experience of the natural world in order to evidence the fact that our judgements concerning the substantial unity of the natural substances which are most known to us, their differences in kind, and the substantial becomings which they are involved in are firmly grounded therein.[10]

## 2. Our Knowledge of Substantial Unity

To begin, we need to clarify what we mean when we speak about "the substantial unity of the natural *substances* which are most known to us." For our purposes here, when we name something "a substance" or "natural substance," we mean to say that it is a "*hoc aliquid*" or "this something." Stated more distinctly, we are affirming that the something in question is, as St.

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[9] *Form and Being*, pp. 118-119.

[10] This "doubling back" to our common experience will involve, amongst other things, the sort of intellectual "reflection" whereby we indirectly know singulars and form propositions such as "Socrates is a man." Regarding this kind of reflection, see *ST* I, q. 86, a. 1, vol. 5, p. 347.

Thomas puts it, "a subsistent being complete in the nature of some species."[11] Furthermore, when we speak of "the substantial unity" which belongs to the natural substances most known to us, we do not primarily mean that the subsistent being in question is "something" or "divided off from other things," although this is certainly true. Rather, we mean that this subsistent being is "one" or "undivided in itself."[12] Hence, when we refer to "the substantial unity of the natural substances which are most known to us," we are primarily conceiving of things such as men, brute animals, and plants as subsistent beings which are undivided in themselves (i.e., they are undivided precisely as subsistent beings). But since it is manifest to everyone that these beings are both subsistent, in some sense of the term, and divided off from other things (and, thus, are numerable),[13] our principal task here is to defend our natural judgement that beings such as men, brute animals, and plants are subsistent beings which are undivided in themselves. If we can do so, then we will have made clear that the natural substances which are most known to us are indeed undivided substances (i.e., undivided subsistent beings).[14]

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[11] St. Thomas gives this definition of "*hoc aliquid*" in *ST* I, q. 75, a. 2 *ad* 1*um*, vol. 5, p. 196. He writes: "*hoc aliquid* potest dici dupliciter: uno modo, pro quocumque subsistente; alio modo, pro subsistente completo in natura alicuius speciei. Primo modo, excludit inhaerentiam accidentis et formae materialis; secundo modo, excludit etiam imperfectionem partis. Unde manus posset dici *hoc aliquid* primo modo, sed non secundo modo. Sic igitur, cum anima humana sit pars speciei humanae, potest dici *hoc aliquid* primo modo, quasi subsistens, sed non secundo modo; sic enim compositum ex anima et corpore dicitur *hoc aliquid*."

[12] On these matters, see *De veritate*, q. 1, a. 1, vol. 22, p. 5. Regarding the concept of "individual," which seems to bring together the two aforementioned concepts, see, for example, *In Sent.*, Bk. 1, d. 19, q. 4, a. 1 *ad* 2*um*, vol. 1, p. 481; *ibid*, Bk. 3, d. 6, q. 1, a. 1, qc. 1, vol. 3, p. 225.

[13] Indeed, this point seems to be conceded by the thinkers whose positions we examined in chapter two. That is, all of those thinkers seem to grant that this non-elemental body which we call "a man," let us say, is, in some sense, substantial and is distinct from or divided off from this non-elemental body which we call "a horse." Yet, what all of these same thinkers agreed in denying was that "a man," "a horse," or any other non-elemental body is as such a substance or an undivided subsistent being.

[14] *In Sent.*, Bk. 1, d. 24, q. 1, a. 3, vol. 1, p. 582, St. Thomas says: "...ens et unum convertuntur, sicut quae sunt idem re, et differunt per rationem tantum, secundum quod unum addit negationem super ens." In the *ad* 1*um* he

Returning briefly to the distinction between what is sensible *per se* and what is sensible *per accidens*, it seems true to say that our judgements concerning the substantial unity of the natural substances which are most known to us are about what is sensible *per accidens*. For as soon as we sense or perceive certain *per se* sensible qualities of something such as Mr. Smith, or this horse, or this oak tree, we are able to make the judgement, "This is one substance." Or, to put it slightly differently, upon sensing or perceiving these certain qualities, we are able to make the judgement "without hesitation and without discourse" that what is before us (be it Mr. Smith, or this horse, or this oak tree, or *alius huiusmodi*) is a subsistent being undivided in itself. Thus, we can say that the substantial unity of the natural substances which are most known to us is something which is sensible *per accidens* and, consequently, our judgements concerning the substantial unity of these substances are judgements which are about what is sensible *per accidens*.

Now in order to show that these same judgements are not in fact "'flat earth' errors," as Fr. Dewan puts it, we shall attempt to elucidate, first, how each man can appeal to his common experience in order to defend his understanding of himself as an undivided substance and, second, how, through an appeal to our common experience of ourselves as undivided substances, we can defend our understanding of the substantial unity of those other natural substances which are most known to us. Hence, let us begin with this question: How can I know that I am a subsistent being

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adds to this by saying: "...dico quod negatio ista in qua perficitur ratio unitatis non est nisi negatio rationis tantum. Omnis enim respectus qui est entis ad negationem vel ad non ens, non est nisi rationis." *Ibid.*, p. 583. Lastly, in the *ad 2um* St. Thomas says: "Primum...quod cadit in apprehensione intellectus est ens et non ens: et ista sufficiunt ad definitionem unius, secundum quod intelligimus unum esse ens, in quo non est distinctio per ens et non ens: et haec scilicet distincta per ens et non ens non habent rationem multitudinem, nisi postquam intellectus utrique attribuit intentionem unitatis, et tunc definit multitudinem id quod est ex unis, quorum unum non est alterum; et sic in definitione multitudinis cadit unitas, sed non e converso." *Ibid.*, p. 584.

undivided in myself and divided off from other things?[15] I can come to see this thanks to my common experience of myself as a principle of many kinds of acts.[16] That is, I cannot help but be aware of the fact that I am the principle of many diverse kinds of acts. Over many of these acts, such

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[15] Since all of the thinkers in chapter two grant that every man, horse, oak tree, etc. is in some way substantial or subsistent and divided off from other things (cf. footnotes 1 and 13 above), I am assuming here that every man recognizes himself to be substantial or subsistent and divided off from other things. Hence, the chief question here is this: How do I know, thanks to my common experience, that I am an undivided subsistent thing? Or, How do I know, thanks to my common experience, that I am one substance?

However, if one were to wonder what basis we have in our experience for distinguishing between the substance that each man is and what we call his "accidents," we could appeal to our internal experience in order to show that our substance is distinct both from our quantity (which is the accident closest to our substance) and, *a fortiori*, from every other one of our accidents. Michael Augros explains well the basis for making this distinction. He writes: "...we can see that substance is distinct from quantity by calling to mind our own growth. I remain today the same individual thing I used to be as a child, only I am now of a different size and shape. If my size were my very substance, I myself would simply cease to exist. But since in fact I remain throughout many changes of quantity, I myself must be something distinct from, and underlying, all the various quantities I've had throughout my life. Thus, to distinguish substance from quantity, we must begin by knowing something in ourselves." This text is from his essay, "Know Thyself," p. 85.

St. Thomas makes a similar point in *In de Trin.*., q. 4, a. 2, vol. 50, p. 125. There he says: "Dimensiones autem iste possunt dupliciter considerari. Uno modo secundum earum terminationem; – et dico eas terminari secundum determinatam mensuram et figuram, et sic ut entia perfecta collocantur in genere quantitatis – ; et sic non possunt esse principium individuationis, quia cum talis terminatio dimensionum varietur frequenter circa individuum, sequeretur quod individuum non remaneret semper idem numero."

[16] The sort of knowledge we have in mind here is the "actualis cognitio" (described by St. Thomas in *De veritate*, q. 10, a. 8, vol. 22, pp. 318-326) by which each man readily perceives himself to have a soul, to be alive, and to be. This kind of knowledge might be described as "quasi-reflective" insofar as it is through knowing his vital acts that a man knows himself to have a soul, to be alive, and to be. Pasnau correctly conceives of this knowledge and the judgements based on it as somehow reflective, but as "pretheoretic." See his, *Thomas Aquinas on Human Nature*, pp. 336-338. François-Xavier Putallaz correctly maintains that this "actualis cognitio" gives us a "perception vague et confuse, mais certaine et commune, du principe des actes..." From his, *Le Sens de la Réflexion chez Thomas D'Aquin* (Paris: Vrin, 1991), p. 111. Putallaz calls this same knowledge "conscience préréflexive" since "elle est antérieure à tout act second de réflexion, à toute analyse abstraite, et qu'elle s'identifie réellement à l'acte direct intentionnel." *Ibid.*, p. 105. Here it is clear that Putallaz wants to carefully distinguish this "actualis cognitio" from the knowledge of the soul that is had from the "reditio completa" which St. Thomas speaks of in *De veritate*, q. 1, a. 9, vol. 22, 1, p. 29. That the doctrine of *De veritate*, q. 1, a. 9 does not presage a Kantian-style transcendental analysis, as some Thomists have claimed, see John F. X. Knasas, "Transcendental Thomism and *De Veritate* I, 9," *Thomistic Papers* VI (Houston: Center for Thomistic Studies, 1994), pp. 246-249.

The reason why we are not appealing here to the more profound and distinct knowledge of ourselves gained through the aforementioned "reditio completa" is because this sort of knowledge presupposes an understanding of many things which we have not yet arrived at (e.g., that form, matter, and privation are the principles of every becoming, what sensation is, what understanding is, etc.). In other words, to defend our substantial unity by looking to what we know about ourselves through the "reditio completa" would be to give a defense which is not at all proportioned to the beginning of natural philosophy.

Below, in our reply to the second objection, we shall have occasion to comment on the "actualis cognitio" described in *De veritate*, q. 10, a. 8 as well as on the "habitualis cognitio" which is presupposed to it.

as my eating, drinking, looking, listening, and thinking, I have dominion. Yet many of the acts which I cause are, in some way, outside of my conscious control. I cannot help but digest my food, nor can I help but grow as a result of having digested my food. Now, it is quite clear to me that in order to perform the different kinds of acts just mentioned, I must use different parts of me which are tools naturally ordered to the performance of such acts. But through this it becomes quite evident to me that my different kinds of tools, such as my eyes, ears, hands, and so forth are permanent parts of me, while the acts which I perform by means of them are rather fleeting in terms of their reality. At the same time, I recognize both that my tools or parts are all distinct from each other, since I see that each of my tools is outside of every other one, and that I am distinct from my surroundings, since I, the subsistent being composed of these variegated tools, am able to distinguish between my tools or parts and those other things which are around me. Yet, despite these distinctions both between my many parts and between me and my surroundings, I remain utterly undivided.

Intimately connected with all of this, I have a most notable experience both of my undividedness in myself and of my distinction from other things, thanks to my most basic yet most certain sense,[17] namely, that of touch. De Koninck describes this experience well while contrasting

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[17] "We are all familiar with the case of St. Thomas the Apostle: '...And when the other disciples told him, We have seen the Lord, he said to them, Until I have seen the mark of the nails on his hands, until I have put my finger into the mark of the nails, and put my hand into his side, you will never make me believe.' St. John, towards the beginning of his First Epistle, reassures us of the indubitable truth of his testimony by the following words: 'Our message concerns that Word, who is life; what he was from the first, what we have heard about him, what our own eyes have seen of him; what it was that met our gaze, and the touch of our hands.'

The attitude of St. Thomas the Apostle is not an example to be imitated, yet in it we recognize a familiar experience: whenever we wish to be very certain about the reality of a thing, of the existence of a sensible object, we want to verify it by touch. And it is especially for this reason that touch is called the sense of certitude, while sight is the sense of distinction, of clarity, and of representation. Where the brute fact of physical existence is concerned, sight notwithstanding its accuracy of discernment and its certitude of distinction, yields less assurance than touch. The words 'phantom' or 'ghost' usually stand for things visual yet unreal, intangible, and we compare them to the kind of representations we have in our dreams." Charles DeKoninck, "Sedeo, ergo sum," *Laval Theologique et Philosophique* (1950), p. 345

the sense of touch with the more noble sense of sight. He states:

> Touch is the sense of substance. I do not mean by this that substance is *per se* sensible, but if there is a sense by which we feel ourselves within ourselves and distinct from other things about us, surely it is the sense of touch. I begin down there and end up here. It is because of touch that I feel my hand belongs to me. Of the parts of myself that I could merely see I cannot "feel" with equal certitude that they belong to me, though I am confident that they may be quite essential.[18]

Thus, from my common experiences just described, it is clear to me that I am a subsistent being undivided in myself, yet divided off from other things. Hence, each man's judgement that, "I am one substance," is firmly rooted in his common experience of the natural world.[19]

It has been pointed out, then, that every man is able to see that his understanding of himself as one substance and only one substance in rooted in his common experience. Yet since each man only has the aforementioned experience of his *own* substantial unity, the following question naturally

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[18] *Ibid.*, p. 346.

[19] It is worth noting that each man knows himself to be not only a substance, but also a *heterogenous* substance (i.e., a substance having parts of different kinds) as opposed to a *homogenous* substance (i.e., a substance having parts all of the same kind).

It is worthwhile noting here that the above quoted Richard Connell seems to share this view as well. He writes: "In fact, the experience we have of our own unity in the midst of the many operations which we perform and which we recognize as distinct from us yet residing in us – this is the first evidence that we have for the distinction between substance and accident. The same 'I' sees, hears, smells, and performs other activities. In other words, that we are substances is something we know by internal experience; we ourselves are the entities which are most obviously substances." See his *Matter and Becoming*, p. 83.

So too as regards the above quoted Fr. W. H. Kane, O.P. He writes: "The substantial nature of sensible things is known concretely by sensory perception, and becomes known distinctly by the intellect. The material organism is perhaps the first and most prominent element in knowledge of self. The organism is the center of our pleasures and pains, the source of impulses, the focus of impressions. Only gradually do we distinguish the whole and the parts on the basis of sensation, perception and memory. Gradually we experience the self abiding in different passing states of pleasure, pain and emotion. Then through the exercise of self-control and choice we become more distinctly aware of the self acting, and by intellect we are able to distinguish sharply between the self as a substantial being and an abiding unit, with many parts, functions and passing states. We know the self as cause of our acts and as subject acting, particularly when making an effort at deliberate reflection or to pay attention to something. At such times we know that our unity of consciousness and our consciousness of personal identity are not mere continuity of consciousness, but rather consciousness of unity at the center and source of various activities." From his, "Self-Knowledge: True and False," *Proceedings of the American Catholic Philosophical Association* 35 (1961), pp. 195-196.

arises: What is there in my common experience which assures me that my judgement is true wherein I affirm that my fellow man is one substance? In the following text, De Koninck provides us with the beginnings of an answer:

> The first notion of life, that to which we ought always to return, comes to us first of all and principally from the internal experience of living. To live is to touch, to taste, to smell, to hear, to see; to discern these sensations one from the other, to imagine, to remember; to love, to hate, to move oneself from place to place, to rejoice, to be sad; to comprehend, to reason, to will. Life is known by us first of all in the consciousness of the very exercise of these operations; and if the words which we use to designate these operations can signify anything for us, it is that we attribute them without difficulty to these operations which we experience within ourselves during their exercise. But the activities which occur within us, without themselves being either acts of knowledge, or the acts of desire or the movement proceeding from knowledge, are very obscure and can only arise from external experience....
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> I see with my eyes and I sense that I move as mine this hand which I fold upon itself and that I feel touching itself. I have the internal experience of having this internal experience. I am ignorant, however, of all the very complex corporal structure that is necessary in order to see with these eyes, with these eyes which I see in the mirror. Nevertheless the life which I experience, the knowledge which I have of knowing sensible objects and of experiencing certain of these as parts of myself, as instruments of my knowledge and of my displacements, all this makes me recognize in my neighbor, in his form, in his movements comparable to mine, a life similar to that which I can only experience in myself.
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> It is fitting, therefore, to affirm that if we did not have this internal experience of living, all life would be totally unknown to us, nowhere would we know how to recognize it and we would not inquire about it.... In this internal experience of thinking about an object, we know in some manner our own intellect. "Knowing itself, it knows also other intellects insofar as it resembles them." And what St. Thomas says about the mind applies as well to the senses and to self-movement according to place. The exterior manifestations of the life of another are only recognized as vital insofar as I comprehend them as similar to my own – which I perceive through this external experience of which I have at the same time an internal experience.[20]

There are three things here which we must note. First, we see that many of the names which

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[20] From his, "Introduction À Étude De L'Áme," in L'Abbé Stanislas Cantin, *Précis de psychologie thomiste* (Quebec, Canada: Éditions De L'Université Laval, 1948). This translation was made by Bruno M. Mondor, O.F. (Somerset, OH: Saint Joseph's Priory, 1951), pp. 5-6. The text from St. Thomas which De Koninck cites here is from *De veritate*, q. 2, a. 3.

designate vital acts are meaningful to us only in virtue of our internal experience of these same vital acts. For example, we see what "seeing" names, what "hearing" names, and what "smelling" means only because, thanks to our common sense, we are able to be conscious of our own acts of seeing, hearing, and smelling.[21]

Second, our vital acts which either are themselves acts of knowledge (i.e., either acts of sense knowledge or acts of intellectual knowledge) or are acts which follow from acts of knowledge (e.g., desires, movement from place to place, etc.) are the vital acts which are most known to us. By contrast, our other vital acts, which are neither themselves acts of knowledge nor acts following from acts of knowledge (e.g., our acts of digestion, growth, etc.) are in some measure obscure to us. And the reason is that, unlike the former vital acts, these latter vital acts are not, as such, objects of our reflective awareness.

Third, it is because of our internal experience of those vital acts which are most known to us, coupled with our external experience of the outward manifestations of those very same vital acts in us, that we are able to identify vital acts of the same kind in men other than ourselves. An example might help to clarify this. When we see a child touch a hot frying pan and then quickly recoil his hand and begin to cry, we know that the child felt (and, perhaps still feels) pain in his hand. But in virtue of what do we know this? What enables us to see or apprehend the child's reaction precisely as a sign of pain? We are only able to see this because (1) we ourselves have felt pain, (2) we have seen in ourselves an outward reaction similar to that which we just saw in the case of the child, and

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[21] In *ST* I, q. 78, a. 4 *ad 2um*, vol. 5, p. 256, St. Thomas writes: "...discernere album a dulci non potest neque visus neque gustus, quia oportet quod qui inter aliqua discernit, utrumque cognoscat. Unde oportet ad sensum communem pertinere discretionis iudicium, ad quem referantur, sicut ad communem terminum, omnes apprehensiones sensuum; a quo etiam percipiantur intentiones sensuum, sicut cum aliquis videt se videre. Hoc enim non potest fieri per sensum proprium, qui non cognoscat nisi formam sensibilis a quo immutatur; in qua immutatione perficitur visio, et ex qua immutatione sequitur alia immutatio in sensu communi, qui visionem percipit."

(3) we have seen in ourselves that the pain which we have felt and the outward reaction which we have had in response to the pain are naturally tied together.

As a result, we must say more generally that it is only in virtue of our understanding within ourselves the natural tie between the outward manifestations of the vital acts which are most known to us and those vital acts themselves, that we are able to see similar outward manifestations in other men precisely as signs which reveal to us that men other than ourselves have the same kind of life that we have.

Now two other texts, also from De Koninck, help us to see what basis we have in our common experience for defending the truth of our judgement that our fellow men are substances. He writes:

> I am conscious of my vital activities: I think, I will, I sense, I raise my arm, I speak, I walk, etc. These activities are mine, I am the principle. But these activities involve objectively observable signs which I connect directly with the activities. But when I find elsewhere similar signs quite independent of the observable signs of my own activities, I attribute them – for they are signs – to a life other than mine, to another subject.[22]

And, immediately thereafter, De Koninck adds:

> It is in that very exploration that we discover the ontological cuts that divide the world into distinct substantial beings. Already having the metaphysical notion of substance, it is easy to identify [myself as] a substantial being. Substance is that which is of itself, [and is the] subject of accidents. But I perform these acts that are mine, I act freely, I enjoy independence with respect to my surroundings, and can oppose them. Concomitant signs enable me to recognize other independent lives. But I have no direct knowledge of my substance, still less that of others. I am obliged to reconstruct them by means of signs.[23]

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[22] *The Writings of Charles De Koninck*, pp., 270-271.

[23] *Ibid.*, p. 337. McInerny's translation of this quote limps a bit. The French is as follows: "C'est dans cette exploration même que nous découvrons les coupures ontologiques qui divisent le monde en êtres substantiels distincts.

The chief point which we should seize upon here is that it is through one and the same set of "objectively observable signs" (i.e., the outward manifestations of those vital acts which are most known to us) that we see not only that men other than ourselves have the same kind of life or being[24] that we have, but also that men other than ourselves have the same sort of undividedness in themselves and division from other things which we have. Or, to be more accurate, we should say that it is through a certain set of "objectively observable signs" (i.e., the outward manifestations of those vital acts which are most known to us) that we see that men other than ourselves have the same kind of life or being that we have and, in seeing this, we understand that men other than ourselves have the same sort of undividedness in themselves and division from other things that we have. Indeed, if other men lacked the same sort of undividedness in themselves and division from other things that we have, they could hardly be said to have the same kind of life or being that we have. Hence, in answer to the question raised above, I can say that I know that my fellow man is one substance precisely because, thanks to my common experience, I see through certain sensible signs that he has the same kind of life or being that I have and, therefore, the same kind of unity that I

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Ayant déjà la notion métaphysique de substance, il est facile de m'identifier comme un être substantiel. Substance est ce qui est en soi, et sujet des accidents. Or, je pose des actes qui sont miens, et j'agis librement, je jouis d'une indépendance vis-à-vis de mon entourage, et je m'y oppose. Les signes concomitants me permettent ainsi de reconnaître ailleurs des îlots indépendants. Mais je n'ai aucune connaissance directe de ma substance, et encore moins de celle des autres. Je suis obligé de les reconstituer au moyen des signes." *Le Cosmos*, pp., 64-65

[24] We say "life or being" here since it is clear that "*vivere est esse viventibus*." A sign that a living thing's life is its being is the fact that everyone recognizes that so long as a living thing is alive, it is. Speaking of the life and the being of a living thing, St. Thomas says: "...vitae nomen sumitur ex quodam exterius apparenti circa rem, quod est movere seipsum, non tamen est impositum hoc nomen ad hoc significandum, sed ad significandam substantiam cui convenit secundum suam naturam movere seipsam, vel agere se quocumque modo ad operationem. Et secundum hoc, vivere nihil aliud est quam esse in tali natura, et vita significat hoc ipsum, sed in abstracto; sicut hoc nomen cursus significat ipsum currere in abstracto. Unde vivum non est praedicatum accidentale, sed substantiale. Quandoque tamen vita sumitur minus proprie pro operationibus vitae, a quibus nomen vitae assumitur; sicut dicit philosophus, IX Ethic., quod vivere principaliter est sentire vel intelligere." *ST* I, q. 18, a. 2, vol. 4, pp. 226-227. See also Fr. Joseph Owens, *St. Thomas Aquinas on the Existence of God: the Collected Papers of Joseph Owens*, ed., by John R. Catan (Albany: State University of New York Press, 1980), p. 243, n. 22.

have.[25]

Now given this, it should be more or less evident how, from our common experience, we can defend the truth of our judgement that familiar brute animals such as horses, dogs, cats, and so forth are undivided substances like ourselves. For, through certain sensible signs, the animals just mentioned, as well as many others, manifest to us that their vital acts are the same, at least generically speaking, as the vital acts which we experience in ourselves. That is, we see that these aforementioned animals see, hear, smell, taste, touch, imagine, remember, and so forth as we do. Connected with this, it is clear that especially through the sense of touch these animals experience (albeit not in a reflective manner) their various parts to be their own and to be distinct from other things (e.g., a dog perceives that its tail is its own and distinct from the child's hand that is pulling on it). We also see that these animals experience at least some of the same emotions that we experience. And, in addition, they are clearly capable of both moving their various parts and moving

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[25] One might think that here we are attempting to set up what modern logicians call "an argument from analogy." Giving an example of such an argument, Patrick Hurley writes, "...someone might argue that because Christina's Porsche is a great handling car, it follows that Angela's Porsche must also be a great handling car. The argument depends on the existence of a similarity, or analogy, between the two cars. The certitude attending such an inference is obviously probabilistic at best." From his, *A Concise Introduction to Logic* (Belmont, CA: Wadsworth Publishing Co., 1994), pp. 34-35. Such, however, is not the case. If we were forced to formalize the discourse of reason that we are trying to describe here, it would look more like this: Whatever clearly exhibits the signs of being an undivided substance is something I know to be an undivided substance. But every one of my fellow men clearly exhibits the signs of being an undivided substance. Thus, every one of my fellow men is something I know to be an undivided substance. In the example given by Hurley, everyone sees that Angela's Porsche may turn out not to be a great handling car. For our minds see that being a great handling car does not necessarily belong to every Porsche. In the case of our fellow men, however, we all see that they clearly exhibit the signs of being undivided substances and, thus, we can say that we know them to be undivided substances. This would seem to be a case of our minds being able to "read inwardly" what stands under certain sensible signs. Regarding this, St. Thomas writes: "...dicendum quod nomen intellectus quandam intimam cognitionem importat, dicitur enim intelligere quasi intus legere. Et hoc manifeste patet considerantibus differentiam intellectus et sensus, nam cognitio sensitiva occupatur circa qualitates sensibiles exteriores; cognitio autem intellectiva penetrat usque ad essentiam rei, obiectum enim intellectus est quod quid est, ut dicitur in III de anima. Sunt autem multa genera eorum quae interius latent, ad quae oportet cognitionem hominis quasi intrinsecus penetrare. Nam sub accidentibus latet natura rerum substantialis, sub verbis latent significata verborum, sub similitudinibus et figuris latet veritas figurata: res etiam intelligibiles sunt quodammodo interiores respectu rerum sensibilium quae exterius sentiuntur, et in causis latent effectus et e converso. Unde respectu horum omnium potest dici intellectus." *ST* II-II, q. 8, a. 1, vol. 8, p. 66.

themselves from place to place. Hence, we can say that we know that familiar brute animals such as horses, dogs, cats, and so forth are undivided substances like ourselves because, from our common experience, we see through certain sensible signs that they have the same generic kind of life or being that we have (i.e., they are sentient beings), and, thus, the same generic kind of unity that we have (i.e., they are undivided in themselves yet divided off from other things).[26]

Having made manifest, then, how we can defend our natural judgements that we ourselves are undivided substances, that our fellow men are undivided substances, and that familiar brute animals are undivided substances, we should now consider how it is that we can defend our natural judgements that lower living things, such as oak trees and other such familiar plants, are undivided substances. Now perhaps the first thing to note here is this: if we do know that oak trees and other such familiar plants are undivided substances, it is not as manifest to us that these things are such as it is that our fellow men and familiar brute animals are undivided substances. For plant life as such is more hidden to us than is the life of animals.[27] For, unlike the vital activities which are common to us and familiar brute animals, the vital activities which are common to us and plants are

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[26] Michael Stokes says, "I am not sure whether I should call a hedgehog more easily and obviously 'one' or 'a unity' than a shoe, and the parts or organs of a body are in the long run as dissoluble as the parts of a shoe; but perhaps the common English use of the term 'an organic whole' is a symptom of a general tendency to treat the natural whole as the paradigm of wholes in general." From his, *One and Many in Presocratic Philosophy*, p. 16.

[27] One text from St. Thomas which bears upon this point is *ST* I, q. 18, a. 1, vol. 4, p. 225: "Respondeo dicendum quod ex his quae manifeste vivunt, accipere possumus quorum sit vivere, et quorum non sit vivere. Vivere autem manifeste animalibus convenit, dicitur enim in libro de vegetabilibus, quod vita in animalibus manifesta est. Unde secundum illud oportet distinguere viventia a non viventibus secundum quod animalia dicuntur vivere. Hoc autem est in quo primo manifestatur vita, et in quo ultimo remanet. Primo autem dicimus animal vivere, quando incipit ex se motum habere; et tandiu iudicatur animal vivere, quandiu talis motus in eo apparet; quando vero iam ex se non habet aliquem motum, sed movetur tantum ab alio tunc dicitur animal mortuum, per defectum vitae. Ex quo patet quod illa proprie sunt viventia, quae seipsa secundum aliquam speciem motus movent; sive accipiatur motus proprie, sicut motus dicitur actus imperfecti, idest existentis in potentia; sive motus accipiatur communiter, prout motus dicitur actus perfecti, prout intelligere et sentire dicitur moveri, ut dicitur in III de anima. Ut sic viventia dicantur quaecumque se agunt ad motum vel operationem aliquam, ea vero in quorum natura non est ut se agant ad aliquem motum vel operationem, viventia dici non possunt, nisi per aliquam similitudinem."

ones about which we are unable to have internal experience of ourselves as their principle. That is, while I do have internal experience of myself as the principle of my act of seeing, or hearing, or desiring, or moving my arm, etc., I am unable to have a reflective awareness of myself as the principle of my assimilating food to myself, or growing, and so forth.[28]

Nonetheless, it does seem as though we do know that oak trees and other such familiar plants are undivided substances. The following text from Fr. Gredt seems to articulate well the basis for our certitude regarding these things:

> If an animal is one substance, living by a vegetative and sensitive life, or informed by a soul which is both vegetative and sensitive, then a plant is one substance living by a vegetative life or informed by a vegetative soul; for the vegetative phenomena in the animal: nutrition, growth, [and] generation, happen in essentially the same way as they do in the plant, nor do they differ except perhaps accidentally. Thus, if these phenomena are vital in the animal, then they ought to be vital in the plant as well. But an animal is one substance, living by a vegetative and sensitive life. Therefore, etc.[29]

Now, in support of his minor premise, Fr.Gredt states:

> An animal is one sentient substance (which in man, the rational animal, is clear from the testimony of the common sense and touch and is shown to be the case in other

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[28] We do, however, experience the pain that results from not assimilating food to ourselves well (e.g., the pain of indigestion) and we are also able to know that we have grown. These and other such things can serve as signs that we really are the principle of the vegetative activities that go on within us even if we cannot have a reflective awareness of being the principle of these activities.

Regarding our knowledge of vegetative life, De Koninck says: "If non-life is essentially obscure, vegetative life is also for the most part obscure. In it we do not touch ourselves as in conscious life. Although life, which we know immediately in our activities, involves as an *essential attribute* a certain interiority – we know these activities both as emanating from the subject and as interior to him – the *signs of interiority* manifest in ourselves, although unconscious, and equally manifest in what we call plants, oblige us to attribute to them some degree of interiority by vital definition." *The Writings of Charles De Koninck*, p. 271.

[29] Si animal est substantia una vivens vita vegetativa et sensitiva seu informata anima, quae simul est vegetativa et sensitiva, etiam planta est substantia una vivens vita vegetativa seu informata anima vegetativa; nam phaenomena vegetativa in animali: nutritio, augmentatio, generatio, eodem modo essentialiter contingunt sicut in planta neque differunt nisi valde accidentaliter. Quare si haec phaenomena in animali vitalia sunt, etiam in planta ita explicari debent. Atqui animal est substantia una vivens vita vegetativa et sensitiva. Ergo. Josephus Gredt, O.S.B., *Elementa Philosophiae Aristotelico-Thomisticae*, vol. 1 (Friburg: Herder, 1953), pp. 341-342

> animals from the way in which they move themselves) which shows the phenomena of vegetation, or the diverse parts of which act in relation to each other so as to nourish and unfold the whole. But one sentient substance, the diverse parts of which act in relation to each other so as to nourish and unfold the whole, is one substance living by a vegetative and sensitive life. Therefore, etc.[30]

Fr. Gredt's main reason for maintaining that oak trees and other familiar plants are undivided substances seems to be contained in the statement which immediately follows his major premise, namely, "the vegetative phenomena in the animal: nutrition, growth, [and] generation, happen in essentially the same way as they do in the plant, nor do they differ except perhaps accidentally." Here he seems to be saying that, owing to the fact that the vegetative activities of animals and of plants are essentially the same, we are justified in making the judgement that plants are undivided substances (i.e., they are subsistent beings undivided in themselves, yet divided from other things). In other words, just as the vegetative activities of an animal arise from powers which are rooted in its undivided substance, so too we must maintain that the vegetative activities of an oak tree or other familiar plant (which activities are essentially the same as those of the animal) arise from powers which are rooted in its undivided substance.[31] Hence, it seems right to say that our common

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[30] Animal est substantia una sentiens (id quod in homine, animali rationali, ex testimonio sensus communis et tactus constat et in ceteris animalibus ex modo, quo se gerunt, ostenditur), quae simul ostendit phaenomena vegetationis, seu cuius diversae partes ad invicem agunt ad totum nutriendum et evolvendum. Atqui substantia una sentiens, cuius diversae partes ad invicem agunt ad totum nutriendum et evolvendum, est substantia una vivens vita vegetativa et sensitiva. Ergo. *Ibid.*, p. 342.

[31] Regarding this sort of argument presented by Fr. Gredt, De Koninck states the following: "This way of looking at it [i.e., this way of defending our judgement that plants are undivided substances] astonishes at first blush. We here dissect a process which comes about spontaneously, but which nonetheless follows the path which we have just described [i.e., the path which makes use of 'objectively observable signs']. The most solid arguments put forth by modern Thomists [e.g., Fr. Gredt *et alii huiusmodi*] are along these lines." *The Writings of Charles De Koninck*, p. 338.

Some, such as the great J. Henri Fabre, maintain that a more detailed look at plants should convince us that even the more familiar ones are not undivided substances, but rather aggregates of many substances. Thus, Fabre writes, "A plant or vegetable may be compared with a polypary covered with polyps; it is not a simple but a collective being, an association of individuals, all related, all closely united, rendering one another mutual service, and working for the prosperity of the whole; like the coral, it is a sort of living hive, all of whose inmates live a life

experience does provide us with a first foundation for our natural judgement that oak trees and other such familiar plants are undivided substances.

Now regarding inanimate things such as fire, air, water, and earth, we should only note here that, from our common experience alone, it is uncertain to us where the substances are to be found. As was pointed out in chapter one, De Koninck seems to put this well when he says:

> It is noteworthy that, in choosing an instance of what is meant by an individual demonstrable to sense, we fix upon a man, or upon some familiar animal, like a horse, but not so readily upon a point on the blackboard, nor even a stone. The reason is that we have internal experience of numerical unity, exhibited in our sensations, in our conscious activities of thinking, doing and making, as belonging to one and the same self. Of the visible point on the blackboard we know that it is just particles of chalk; and of the stone, that while it may have the tangible and visible appearance of an individual like an individual man, it might still be many individuals. That a stone is an instance of individuality in some fashion is beyond doubt – there is nothing universal about this stone – but the individuality could be like that of a single crowd, or of an individual sun. We do not think this of a horse.[32]

For our purposes here, it is enough for us recall the three possibilities which we laid down in chapter one. That is, either the inanimate things which we designate as substances (e.g., this rock, this water, this fire) are themselves undivided inanimate substances or they are collections of undivided inanimate substances, or finally they are but parts of some single inanimate substance.[33]

Now before we move to a consideration of how our common experience provides us with a foundation for our natural judgement that the natural substances with which we are most familiar

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in common." This is taken from his *The Wonder Book of Plants* (New York: Carrot Sky Press, 2001), p. 13. See also chapter two entitled, "The Individual Life of the Vegetable," pp. 14-20. In these texts, however, Fabre fails to distinguish between act and ability. We shall address a similar kind of objection to the substantial unity of man in chapter nine of this essay.

[32] "Abstraction from Matter," pp. 183-184.

[33] Recall here the words which we cited from De Koninck in chapter one: "I see nothing more unfitting in an inorganic world, substantially one in which innumerable living things vegetate, than in one tree on which insects munch the same leaves." *The Writings of Charles De Koninck*, p. 272.

are of many really different kinds, we should attempt to bring together what we have established heretofore. We can do this by considering how our knowledge of the substantial unity of the natural substances which are most known to us is related to the substantial becomings which involve these same natural substances. More specifically, since it has been made clear what basis we have in our common experience for affirming that every man, familiar animal, and familiar plant is one substance, we can maintain that every becoming in which a man, familiar animal, or familiar plant comes to be is a becoming in which that at which the becoming terminates (i.e., the man, familiar animal, or familiar plant), taken precisely as such, is one substance. Likewise, we can also hold that every becoming in which a man, familiar animal, or familiar plant ceases to be is a becoming in which that to which the becoming in attributed (i.e., a man, a familiar animal, or a familiar plant), taken precisely as such, is one substance. Similarly, every becoming in which a man, familiar animal, or familiar plant assimilates food to itself is a becoming in which that at which the becoming terminates (i.e., an already existing man, familiar animal, or familiar plant), taken precisely as such, is one substance. Putting these points together, we are justified in setting forth the following syllogism:

> Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.
> But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
> Therefore, some becomings which we think are substantial becomings are becomings in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.

Let this suffice for our defense of our natural judgement that the natural substances which are most

familiar to us are indeed undivided substances.[34]

### 3. Our Knowledge of Natural Kinds

Next, we must defend our natural judgement that the natural substances which are most familiar to us are in fact of many really different kinds by showing that this judgement too is firmly based in our common experience of the natural world.[35] We can begin by noting that we all take it as known that the natural substances which are most known to us are specifically different. For example, we all readily see that the following statements are true: "No man is a brute animal," "No brute animal is a plant," "No plant is an inanimate body," and so on. Now while these statements are evidently the products of the second act of reason, the judgements that we are making here clearly depend on our understanding of certain things that are sensible *per accidens*. In other words, it is only because we have perceived many men, brute animals, plants, and inanimate bodies (each of which is sensible *per accidens*) and have understood what these things are that, in turn, we are able to form the aforesaid statements whereby we express our judgements that these natural substances do in fact differ in kind. Furthermore, since these differences in kind (i.e., various species-making differences) are rooted in substances which are properly called "sensible *per*

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[34] The way that we have attempted to defend the substantial unity of the natural substances most known to us may be controversial to many Thomists. For not all Thomists agree that we ought to appeal to our internal experience in order to make a defense of the substantial unity of the aforesaid substances. In the response to the second objection below, we shall briefly review and argue against Fr. George Klubertanz's attempt to defend the substantial unity of living things based solely on what we know from our external experience (see footnote 54 below).

[35] It is probably already clear what we mean here when we say that the natural substances which are most familiar to us are in fact of many "really different kinds." But for the sake of further clarifying this, we mean to say that the *natures* of some of the substances which are most familiar to us really differ from each other. Or, again, *what* some of these same substances are differ from each other.

*accidens*," it seems true to say that our judgements such as, "No man is a brute animal," "No brute animal is a plant," and so on are judgements about what is rooted in what is sensible *per accidens*.

Now although everyone readily grants the truth of the statements, "No man is a brute animal," "No brute animal is a plant," "No plant is an inanimate body," etc., we can wonder about the aspects of our common experience which enable us to see that these statements are in fact true. In order to help us delineate these proper aspects of our common experience, let us consider the following text from Fr. Kane:

> ...through experience we know that the world consists of many types of substances with sensible properties which are abruptly distinct and clearly different. By means of its sensible properties a changeable being manifests to us the nature of its substance. If there were no intrinsic reason for a substance to have certain accidents, or no necessary connection between a substance and any of its accidents, then definite types of substances would not be found in different and changing environments. In nature we do not find the typical human head joined to the body of a dog, but to the human body. The malformations which occur among various organisms are contingent and exceptional, whereas the typical forms recur as a rule through many generations. As a changeable being appears and acts sensibly, so it is. Each definite and stable type in the world requires as its sufficient intrinsic reason a certain kind of substance. As a changeable being is, so it is apt to appear and to act sensibly. The specific nature of an observable substance is manifested to us through its sensible properties or accidents which are abruptly distinct and clearly different from those of other types. Clearly distinct types, such as a man, a horse and an oak tree, exhibit different properties and activities, which are not merely impressed upon them from without but proceed from within the substances themselves. Therefore, these types are different in substance, that is, they are individuals of distinct species. Hence changeable being is not one specifically, but consists of groups of substances which differ in specific nature.[36]

Given this text, how do we see, from our common experience, that things such as men, horses, oak trees, and rocks, let us say, are substances of really different kinds? In answer to this question, Fr. Kane points out that it is when we see the profound differences between the sensible properties of

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[36] Fr. W. H. Kane, "The First Principles of Changeable Being," *The Thomist* (1945), pp. 36-37

things such as men, horses, oak trees, and rocks that we realize that the very natures of these same substances are profoundly different. More specifically, it is when we see the profound differences between the "activities" or operations of these substances that we see that these same substances differ profoundly in terms of what they are. Now it is worth to noting that St. Thomas too sees a thing's operation as revelatory of the nature of its substance. Regarding this he says:

> ...the proper operation of anything follows from and makes known the thing's species. But just as the proper operation of animal is to sense, so the proper operation of man is to understand... Whence, it is necessary that just as this individual is an animal on account of sense,... so he is a man on account of that by which he understands.[37]

It is clear, then, that the profound differences between the proper operations of substances such as men, horses, oak trees, and rocks are signs to us of the profound differences between the very natures of these same substances. That is, just as within ourselves we distinguish both our vegetative powers from our powers of sense and our powers of sense from our intellectual powers, and this based on the different kinds of operations which are proper to these powers, so too, outside of ourselves, we distinguish both plants from brute animals and brute animals from men, based on the different kinds of operations which are proper to these substances. For plants only exercise vegetative operations, brute animals exercise both vegetative operations and sensitive operations, and men exercise vegetative operations, sensitive operations, and intellectual operations. Furthermore, we distinguish plants, brute animals, and men from inanimate substances since these latter do not exercise any vital operations at all. Hence, it is true to say that it is because we see the profound differences between the activities or operations which belong to things such as men, horses, oak trees, and rocks, that we

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[37] Propria...operatio cuiuslibet rei consequitur et demonstrat speciem ipsius. Sicut autem animalis propria operatio est sentire, ita hominis propria operatio est intelligere... Unde oportet quod sicut hoc individuum est animal propter sensum,...ita sit homo propter id quo intelligat. *SCG* Bk. 2, ch. 73, vol. 13, p. 459.

see that these same substances differ profoundly in terms of what they are.[38]

Now although it is sufficient for our purposes to rest in the differences in kind just evidenced to exist between, men, brute animals, plants, and inanimate substances, one might still wonder how it is that we recognize there to be differences in kind amongst brute animals, plants, and inanimate substances.[39] One lead that St. Thomas gives us has to do with the differences in shape that belong to various natural substances. That is, St. Thomas notes that although we may recognize many qualitative differences amongst various brute animals, plants, and perhaps even amongst inanimate substances, our most certain judgements regarding differences in kind amongst these substances comes from our grasping the differences in their respective shapes or figures. He states:

> ...it must be considered that amongst all qualities, figures most of all follow from and demonstrate the species of things. This is especially clear in plants and animals, in which the diversity of species can be judged by no more certain judgement, than by the diversity of figures. And this is the case because just as quantity stands closer to substance than any other accident, so figure, which is the quality around quantity, stands closer to the form of substance [than any other accident].... And because of this it happens that an image, which is an expressed representation of a thing, is seen to be such more by its figure than by its color or something else.[40]

Hence, it seems that we are able to distinguish between different kinds of brute animals, plants, and

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[38] For an explication of how our internal experience can be used as a guide for distinguishing the various levels of agency in living things see, Robert Augros, *The New Biology: Discovering the Wisdom in Nature* (Warner, NH: Principle Source Press, 1987), pp. 86-87.

[39] Here we are assuming for the sake of argument that there are different kinds of inanimate substances and not just different kinds of parts of one single inanimate substance.

[40] "...considerandum est, quod inter omnes qualitates, figurae maxime consequuntur et demonstrant speciem rerum. Quod maxime in plantis et animalibus patet, in quibus nullo certiori iudicio diversitas specierum diiudicari potest, quam diversitate figurarum. Et hoc ideo, quia sicut quantitas propinquissime se habet ad substantiam inter alia accidentia, ita figura, quae est qualitas circa quantitatem, propinquissime se habet ad formam substantiae.... Et ex hoc contingit quod imago, quae est expressa rei repraesentatio, secundum figuram potissime attendatur, magis quam secundum colorem vel aliquid aliud." *In Phys.* Bk. 7, *lectio* 5, vol. 2, p. 339. See also *ST* I, q. 35, a. 1, vol. 4, p. 372.

even inanimate substances based on differences which we see in their respective shapes or figures. This being said, the differences in kind which we seem to perceive amongst brute animals, plants, and inanimate substances pale in comparison to the more radical differences in kind which we observe to exist between men, brute animals, plants, and inanimate substances.[41]

Having seen this, we are in a position to sum up how our knowledge of the real differences in kind amongst the natural substances which are most known to us is related to the substantial becomings which involve these same natural substances. Thinking in terms of becoming, we can now say that it is clear that every becoming in which a man, familiar animal, or familiar plant comes to be is a becoming in which that to which the becoming is attributed (i.e., the reproductive materials of a man, the reproductive materials of a familiar animal, or the reproductive materials of a familiar plant) and that at which the becoming terminates (i.e., a man, a familiar animal, or a familiar plant) really differ in kind. In a similar way, it is clear that every becoming in which a man, familiar animal, or familiar plant ceases to be is a becoming in which that to which the becoming is attributed (i.e.,

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[41] We recall here a text that we cited from De Koninck in chapter one: "The ensemble of beings constituting nature is divided into four species: men, animals, plants, and the inorganic. One can know without understanding: animal; live without knowing: plant; be without living: inorganic. These four species are the only ones philosophically definable. The canine species is not a species in the philosophical sense.

Natural species thus constitute a hierarchy. The plant is manifestly more perfect than the rock or a nebula (abstracting from the life it may contain), being at once corporeal and vegetative. The animal is at once sensitive, vegetative, and corporeal; to which man adds rationality. We say that these species are essentially different. One lives or one does not, one can know or one cannot. There is no intermediary." *The Writings of Charles De Koninck*, p. 258.

Fr. Dewan interestingly opines that our knowledge of the diversity of species or essences might not be as fundamental in our knowledge as is our knowledge of numerical diversity amongst substances. He writes: "...the knowledge of specific difference is not as primary as the intellectual appreciation of individual diversity. The issue of diversity of individuals or substances is not at exactly the same level of difficulty or evidence as the issue of diversity of species or essences. (An indication of this is the power of the position of Hume vis-à-vis the mind; the argument of Hume concerning causality is rooted in our conviction that one being is not another, that this is not that." Fr. Dewan goes on to suggest that "the natural sequence of natural intelligibles would be: (1) essence, (2) substance(s), (3) inherence, (4) cognition, (5) essential hierarchy." See his, "Laurence Foss and the Existence of Substances," *Laval Theologique et Philosophique*, 44 (1988), pp. 77-84. The quotes are from pages 83 and 84, respectively.

a man, a familiar animal, or a familiar plant) and that at which the becoming terminates (i.e., the corpse of a man, the remains of a familiar animal, or the remains of a familiar plant) really differ in kind. Also, it is evident that every becoming in which a man, familiar animal, or familiar plant assimilates food to itself is a becoming in which that to which the becoming is attributed (i.e., some food or other) and that at which the becoming terminates (i.e., an already existing man, familiar animal, or familiar plant) really differ in kind. We can summarize these points in the following syllogism:

> Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.
> But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
> Therefore, some becomings which we think are substantial becomings are becomings in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.

Let this suffice for our defense of our natural judgement that the natural substances which are most known to us are in fact of many really different kinds.

## 4. Our Knowledge of Substantial Becoming

At this point, it remains for us to manifest the fact that our natural judgement concerning the reality of substantial becoming is also firmly based in our common experience. In other words, we shall attempt to describe here how it is that, thanks to our common experience, we can be certain about our judgement that the natural substances which are most known to us change into one another. Let us begin by noting that when we make judgements such as, "Human reproductive materials become men," or, "Men become corpses," or, "Apples, when consumed, become the flesh and bones

of horses," and so on, it is clear that all of these judgements depend on our grasp of certain things that are sensible *per accidens* (e.g., men, corpses, horses, etc.). Further, as was the case with our judgements concerning differences in kind amongst the natural substances most known to us, these judgements concerning substantial becoming are judgements which are about what is rooted in what is sensible *per accidens*. For just as differences in kind (i.e., species-making differences) are rooted in substances which are properly called sensible *per accidens*, so too are substantial becomings in some way rooted in these same substances. Lastly, we should note that although judgements concerning substantial becoming such as, "Men become corpses," are properly acts of reason, they, nonetheless, presuppose many acts of sensation, both external and internal (e.g., various acts of sight, memory, and acts of the cogitative power).

Here we shall not attempt to make clear that the natural substances most known to us move from place to place or that they change in terms of their qualities and quantities. For the former kind of change (i.e., locomotion) is granted by both *Monism* and *Pluralism* which we examined in chapter two. And, as we also saw in chapter two, the latter kinds of change (i.e., alteration, growth, and shrinking) are denied by those who hold to *Monism* and *Pluralism* insofar as they see them either as changes which lead to substantial becoming or as changes which follow from substantial becoming, respectively. For these thinkers deem substantial becoming to be impossible. Hence, if we can point out some real instances of substantial becoming, we shall thereby destroy the reason for these thinkers' denial of the reality of alteration, growth, and shrinking.

Fr. Kane describes what we understand to be the case from our common experience of the natural world when he states that, "the sensible world is...a theater in which substantial changes are constantly taking place. The kind of being which is found in the sensible world is being that is

substantially changeable."[42] Yet, what it is in our common experience that assures us that this understanding of the natural world is not a "'flat earth' error"? Fr. Kane helps us here as well. He writes:

> ...if there were no substantial changes occurring in the world, every individual would be substantially incorruptible and would perpetually retain its sensible properties. This, however, is not what we discover when we examine the sensible world. We find that the sensible properties of many individuals disappear, and new sensible properties abruptly distinct from the old ones make their appearance. Living organisms cease to perform the activities which manifested their vegetative or sensory or rational life. Their remains show only the properties of the chemical elements and their compounds.... [W]e find that both living and non-living things lose their properties or at least their independence and become parts of other things when they are assimilated through the nutritive activities of living organisms.
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> ...We have seen that abruptly distinct sensible properties in different individuals manifest the presence of specifically distinct substances. The sensible properties of physical substances are found to change abruptly. The new and different properties manifest the presence of a new and different substance. In many instances we can be sure that there has not been a mere substitution of one substance for another, and we assume that the new substance does not come from nothing. It must, therefore, come from the old substance. Living things become non-living things, and non-living things become parts of living things. Elements become compounds, and compounds elements. These are [therefore] substantial generations and corruptions in which one kind of physical substance becomes another kind of physical substance.[43]

Here Fr. Kane lays out the two fundamental possibilities. Either there are no substantial becomings in the world or there are some such becomings. If the former, then "every individual would be substantially incorruptible and would perpetually retain its sensible properties." This consequent, however, is contradicted by our common experience. For it is a quotidian experience that the natural substances which are most known to us lose their sensible properties and, thereby, reveal to us that

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[42] Fr. W. H. Kane, O.P., "Hylemorphism and the Recent Views of the Constitution of Matter," p. 69.

[43] *Ibid.*, pp. 68-69.

they no longer are.[44] Yet, as soon as some old substance ceases to be, some new substance, which manifests its existence to us through its sensible properties, always begins to be. Hence, as soon as Mr. Smith breathes his last (and, thus, ceases to be), the new substance which we call, "the corpse of Mr. Smith," begins to be. Thus, in such cases, it is plain that the old substance actually changes into or becomes the new substance.[45] But this is to admit that there are indeed some substantial becomings in the world around us.

Now, in order to point out some real instances of substantial becoming, let us focus our attention on every becoming in which men, familiar animals, or familiar plants come to be, cease to be, and assimilate food to themselves. By this point it should be evident that every becoming in which men, familiar animals and familiar plants come to be is indeed a substantial becoming. For, in every becoming of this sort, substances which are not men, familiar animals, or familiar plants (i.e., the reproductive materials of a man, the reproductive materials of a familiar animal, or the reproductive materials of a familiar plant) change into or become men, familiar animals, or familiar plants.[46] In other words, in every becoming of this sort, this substance of this kind truly becomes that

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[44] Hence, John F. X. Knasas makes the following point: "The same constant accidents that indicate the presence of substance can also indicate the disappearance of substance. My vital signs may cease, for example. The loss of these accidents indicates that the substance that is me is no longer present." *Being and Some Twentieth Century Thomists*, p. 12.

[45] Here we are taking it for granted that everyone admits that there is some matter or material principle which underlies the change from beginning to end. In chapter six we shall attempt to show how we come to understand that there is some such matter in every change that we commonly think of as a substantial change.

[46] We are not claiming here that we know from our common experience the actual number of substances to which these substantial becomings are attributed. Even if it be the case that there are many substances which change into or become a man, it is still true to say of each of these substances, "this substance of this kind becomes that substance of that kind." By contrast, it is true to say that in every becoming wherein a man, familiar animal, or familiar plant comes to be, we do know that the substance at which the becoming terminates is one in number.

substance of that kind.[47] Hence, we can see that every becoming in which men, familiar animals and familiar plants come to be is indeed a substantial becoming.

Next, we can manifest the fact that every becoming in which men, familiar animals, and familiar plants cease to be is indeed a substantial becoming. For, in every becoming of this kind, a substance of one kind (i.e., a man, a familiar animal, or a familiar plant) changes into or becomes some substance(s) of some other kind(s) (i.e., the corpse of a man, the remains of a familiar animal, or the remains of a familiar plant). Thus, we see that every becoming in which men, familiar animals and familiar plants cease to be is in fact a substantial becoming.

Furthermore, it can be made clear that every becoming in which men, familiar animals, and familiar plants assimilate food to themselves is indeed a substantial becoming. For, in every becoming of this sort, a substance of one kind (i.e., a certain food) becomes a substance of another kind (i.e., an already existing man, familiar animal, or familiar plant). That is, in every becoming of this sort, this substance of this kind truly becomes that substance of that kind. Hence, we readily grasp that every becoming in which men, familiar animals and familiar plants assimilate food to themselves is indeed a substantial becoming.

Now up to this point we have only manifested the fact that the *animate* natural substances which are most familiar to us are involved in substantial becomings, either as that to which these becomings are attributed or as that at which they terminate. What about *inanimate* natural substances? Can we ever affirm that these substances are that to which a substantial becoming is attributed or that at which a substantial becoming terminates?

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[47] It should be noted that in order for a substantial becoming to be a substantial becoming, it is not necessary that the substance to which the becoming is attributed differ in kind from the substance at which the becoming terminates. Rather, all that is required is that this substance becomes that substance.

It seems that the answer to these questions is implied in what we have already manifested. For, on the one hand, we see quite clearly that the animate natural substances which are most known to us change into or become inanimate natural substances when they die. Thus, when men or familiar brute animals or familiar plants die, the corpse which remains is either some inanimate natural substance or some collection of inanimate natural substances. And, on the other hand, we see quite clearly that inanimate natural substances change into or become some of the already existing animate natural substances which are most known to us whenever the former are eaten and assimilated by the latter. For example, whenever a man or familiar brute animal or familiar plant consumes water or salt or some other familiar inanimate natural substance and assimilates it to itself, it is clear that the water or salt or other some other familiar inanimate natural substance comes to be part of the substance of the man or of the brute animal or of the plant and ceases to be water or salt or some other substance.

At this point, we are able to bring together what we have manifested here in the following syllogism:

> Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is indeed a substantial becoming.
> But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
> Therefore, some becomings which we think are substantial becomings are indeed substantial becomings

Having made clear, then, in what sense the substantial unity of, the differences in kind between, and the substantial becoming of the natural substances which are most familiar to us are "known to us from our sense experience" or are "sensible," and having defended our natural judgements concerning these three things by looking back to certain aspects of our common experience, we should now take up three objections which can reasonably be raised against what we

have established above.

## 5. Objections and Replies

The first objection can be put as follows: If we know that we often err in our judgements about certain matters, then we ought not to trust our judgements concerning those matters. Yet, we know that we often err in our judgements about the substantial unity of, the differences in kind between, and the substantial becoming of the natural substances which are most familiar to us. For example, from a distance, one might mistake a manikin (i.e., many substances closely joined together and ordered to each other) for a real man or woman and, thus, for one substance. Likewise, one might think at first that something (e.g., a sea anemone) is a plant and only later realize that it is an animal. Or, one might think that a certain natural substance has died (e.g., a houseplant that has not been watered for some time) and only later discover that the apparently dead thing was in fact alive all along. Hence, we ought not to trust our judgements concerning the substantial unity of, the differences in kind between, and the substantial becoming of the natural substances which are most familiar to us.

In response to this, we should concede something to the objection. That is, it is true that we do often err in our judgements about these matters.[48] In fact, concerning an animal's general

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[48] Both DeKoninck and Knasas seem to hit on the reason why we often err in these matters. Commenting on St. Thomas's comments on *On the Soul*, Bk. 1, ch. 1(wherein St. Thomas says in *capitulum* 1, vol. 45, 1, p. 5: "...Certa est, hoc enim quilibet experitur in seipso, quod scilicet habeat animam, et quod anima vivificet"), DeKoninck writes: "St. Thomas does not speak there of the life we observe in others, for if the life of another were as such immediately grasped, it would suffice to say *hoc quilibet experitur*. But since the life of another is not immediately known to us, he adds *in seipso*. If it were that of others, one could [not] be mistaken, and it often happens that we are mistaken, as in the many cases we cannot decide whether we are dealing with a living or non-living thing, with a vegetable or an animal, or as sometimes happens when a work of art gives us the illusion of life. We can only grasp the life of another by means of the *signs of life*." *The Writings of Charles De Koninck*, p. 270.

Similarly, Knasas says: "...accidents are perceptually basic. They, and not the substance that is Fido the dog, Flicka the horse, or Flossy the cow, are what one immediately and directly perceives with the senses. With the eyes one is in direct relation to the black color of Flicka's mane, but the eyes do not go further and give Flicka. If they or the other senses did directly present a substance, impersonation of one substance by another would be

propensity for error, Aristotle says, "it is necessary for them [i.e., the ancients] to speak also at the same time of erring, for this is more proper to animals, and the soul remains in this for a longer time."[49] Commenting on this text, the Angelic Doctor writes:

> ...deception seems to be more proper to animals than knowledge according to the condition of their nature. For we see that, left to themselves, men are able to be deceived and to err. But in order that they know the truth, it is necessary for men to be taught by others. And, again, the soul spends more time in error than in knowledge of the truth, since it arrives at knowledge of the truth with difficulty after a long period of study.[50]

But granted this concession to the objection, the question we should ask is this: Does the consequent necessarily follow from the antecendent in the first premise of the hypothetical syllogism presented above? In other words, granted that we know that we often err in our judgements about certain matters, does it follow that we ought not to trust our judgements concerning those matters?

It seems not, for counterexamples abound. For example, a man might know that he often errs in his judgments about mathematical matters. That is, the man in question might know that he often makes mistakes in his addition and subtraction. Yet, does this imply that he is incapable of knowing for certain that he is not failing here and now in his addition or in his subtraction? Clearly not. For it is clear that if he attends well to the numbers before him, such a man is able to know for certain that he is correctly adding or subtracting.

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impossible." *Being and Some Twentieth Century Thomists*, p. 11.

In other words, it is because these three realities are known to us only through certain sensible signs, which we often misunderstand or misread, so to speak, that we often find ourselves making erroneous judgements regarding these three realities themselves.

[49] *On the Soul*, Bk. 3, ch. 3, 427b2-b4.

[50] ...deceptio videtur esse magis propria animalibus quam cognitio secundum conditionem suae naturae; videmus enim quod homines ex seipsis decipi possunt et errare, ad hoc autem quod veritatem cognoscant, oportet quod ab aliis doceantur; et iterum pluri tempore anima est in deceptione quam in cognitione veritatis, quia ad cognitionem veritatis vix pervenitur post studium longi temporis. *In de Anima*, Bk. 2, *capitulum* 28, vol. 45, 1, p. 189.

Similarly, a man might know that he often errs in his judgements about whether he is presently experiencing a dream or presently experiencing reality. That is, the man in question might know that, while he is asleep, he often fails to distinguish between his dream and what is real. But does this imply that such a man is incapable of knowing for certain that he is not dreaming here and now? Again, clearly not. For if the man in question is presently aware of perceiving real objects around him, then he knows for certain that he is presently awake.[51]

As a result, granted that we know that we often err in our judgements about the substantial unity of, the differences in kind between, and the substantial becoming of the natural substances which are most familiar to us, it does not follow that we ought not to trust our judgements concerning these matters. For even though we do often misunderstand the signs which reveal to us these attributes or properties of the natural substances which are most familiar to us, it does not follow that we are incapable of knowing for certain that here and now we are understanding these same signs correctly. For just as the man mentioned above is able to know that he is presently awake because he is presently aware that he is perceiving real objects around him, so too we are able to know that we are here are now understanding the aforementioned signs correctly because we are here and now aware that the signs before us are real signs of the substantial unity of, the differences in kind between, and the substantial becoming of the natural substances which are most familiar to us.

The second objection which can reasonably be raised against what we have established above may be put as follows: Every view which is grounded in subjective experience is to that extent

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[51] On this topic see, John F. X. Knasas, "Aquinas's Metaphysics and Descartes's Methodic Doubt," *The Thomist* 64 (2000): pp. 49-72. Regarding the dream argument, Fr. Dewan writes: "...the experience of the waking state is fundamental and it is not confused with dreaming. Dreaming is secondary, and consists quite regularly in mistaking appearances for the waking state. It is notable that sometimes we know we are dreaming." From, "Laurence Foss and the Existence of Substances," p. 80.

uncertain. But the claims here regarding how we can be certain of our judgements about the substantial unity of the natural substances which are most familiar to us are, in some measure or another, grounded in our internal experience which is subjective experience. Hence, these claims are to some extent uncertain.

In answering this objection, let us begin by drawing a distinction between two ways in which experience can be considered to be "subjective." Regarding this, Michael Augros states:

> A scientist would not be censured for claiming that water boils under certain conditions because we could not be there to witness his water boiling; it is enough that we can witness this for ourselves with our own water if we take the trouble. Why should a matter of reflection be any different? It is true that someone else cannot share my reflection upon the goings-on of my own interior life, but surely he can verify within himself kinds of experiences that I claim are the same for everyone. A trivial example: smells are evocative of memories more than colors or textures are. If one cannot reliably reflect on one's own knowledge, one could never know this.
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> Reflective experience is "subjective" is the sense that its object is something going on within the knowing subject. But it is not "subjective" in the sense that irrelevant features of the knowing subject are hopelessly confused with the object perceived. "How hot it feels to me" is a mixed result of the temperature of my hand and the temperature of what I am touching. My sensation alone cannot separate these. Therefore "how hot it feels to me" is "subjective" in the usual and somewhat pejorative sense of the word. But reflections such as "I am thinking right now," and "hearing is different from seeing," involve no such confusion.[52]

Here we see two meanings that the name "subjective" has when said of certain experiences. That is, some experiences are called "subjective" because they involve a hopeless confusion between irrelevant features of the knowing subject and the object perceived, while others are called

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[52] "Reconciling Science with Natural Philosophy," pp. 116-117. Similarly, Robert Augros says, "The internal experience we have of our own living activities is rejected by some as "subjective," and therefore unreliable for the purposes of science. Regarding hallucinations or other purely private phenomena not accessible to others, their claim would be justified. But we speak here of activities anyone can immediately verify in himself: to sense, to remember, to feel fear or joy, to understand, to choose. This experience is universal and must serve as the constant guide and standard when investigating these abilities in man or in animals. What does it matter that one man cannot experience another man's sensation of red? He has his own. Whatever is verifiable in everyone's internal experience is just as much a fact of biology or psychology as the rat's performance in a maze or the molecular structure of a protein." *The New Biology*, p. 84.

"subjective" due to the fact that their "object is something going on within the knowing subject." Now it should be clear that while the major premise of the aforementioned objection has the first meaning of "subjective" in mind, the minor premise, in order to be true, must have in mind the second meaning of "subjective." Hence, this objection fails since it equivocates on the word "subjective," and, thus, has two middle terms.

Now it is essential to see here that when we maintain that our judgements concerning the substantial unity of the natural substances which are most familiar to us are grounded, in some measure or another, in the kind of "subjective" (in the second meaning of the term) experiences which have been outlined above, this is "...not because internal experience can come before external experience, but rather because this particular internal experience gives us a more direct contact with the thing to be known."[53] In other words, it is precisely because our internal experience in some way gives us a better purchase of our substantial unity, than does our external experience all by itself, that we naturally have recourse to it in our attempt to defend our knowledge of the object in question.[54]

In order to explain this point more fully, we should point out that while each man may know

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[53] Warren Murray, "If T'were a Substance," *Philosophia Perennis* 1 (1994), p. 118.

[54] It is interesting to note the way in which Fr. Klubertanz attempts to show that every living thing is one substance. He readily recognizes that in our internal experience we men are able to apprehend our substantial unity. However, when it comes to showing that each living thing as such is one substance, he relies solely on external experience as his guide. He writes: "That is one supposit (one existing substantial unit) whose parts act primarily and directly for the good of the whole, and only secondarily for their own good. But: The parts of any living thing (organism) act primarily and directly for the good of the whole, and only secondarily for their own good. Therefore: every living thing is a substantial unit or supposit." *The Philosophy of Human Nature* (New York, NY: Appleton-Century-Crofts, Inc., 1953), p. 36. This "proof" seems problematic, for as St. Thomas points out, there are many things which are not substances "whose parts act primarily and directly for the good of the whole, and only secondarily for their own good" (*ST* II-II, q. 26, a. 3, vol. 8, p. 210). For example, every well ordered family, village, and city (each one of which is, materially speaking, only a collection of many substances) is a whole whose parts act in this way. Our point here is not that one should neglect to attend to his external experience in these matters. Rather, we are merely suggesting that our grasp of certain objects of knowledge, such as our substantial unity, is attained more perfectly when we attend to the insight that we have into these objects thanks to our internal experience.

something of his substance (which is sensible *per accidens*) by employing his external senses coupled with his cogitative power and his power of understanding, it is difficult to see how anyone can offer a satisfactory defense of his natural judgement that he is an undivided substance without some recourse to his internal or subjective experience (according to the second meaning given above) of himself as the principle of many kinds of acts which he performs through his many diverse tools or parts. Indeed, St. Thomas clearly states that it is through this sort of internal or subjective experience of himself as the principle of many kinds of acts that each man knows that he has a soul, that he is alive, and that he exists. Regarding this, he writes:

> ...as regards the actual knowledge by which someone considers himself to have a soul in act, I say that the soul is known through its acts. For someone perceives himself to have a soul, and to live, and to be from the fact that he perceives himself to sense and to understand and to exercise other similar vital acts.... But no one perceives himself to understand except from the fact that he understands something, since to understand something is prior to understanding oneself to understand. And, thus, the soul comes to perceive actually its existence from the fact that it understands or senses.[55]

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[55] Quantum...ad actualem cognitionem, qua aliquis se in actu considerat animam habere, sic dico, quod anima cognoscitur per actus suos. In hoc enim aliquis percipit se animam habere, et vivere, et esse, quod percipit se sentire et intelligere, et alia huiusmodi vitae opera exercere... Nullus autem percipit se intelligere nisi ex hoc quod aliquid intelligit: quia prius est intelligere aliquid quam intelligere se intelligere; et ideo anima pervenit ad actualiter percipiendum se esse, per illud quod intelligit, vel sentit. *De veritate*, q. 10, a. 8, vol. 22, p. 321.

Regarding the habitual knowledge that the soul has of itself which underlies the actual knowledge just described, St. Thomas teaches: "Sed quantum ad habitualem cognitionem, sic dico, quod anima per essentiam suam se videt, id est ex hoc ipso quod essentia sua est sibi praesens est potens exire in actum cognitionis sui ipsius; sicut aliquis ex hoc quod habet habitum alicuius scientiae, ex ipsa praesentia habitus, est potens percipere illa quae subsunt illi habitui. Ad hoc autem quod percipiat anima se esse, et quid in seipsa agatur attendat, non requiritur aliquis habitus; sed ad hoc sufficit sola essentia animae, quae menti est praesens: ex ea enim actus progrediuntur, in quibus actualiter ipsa percipitur." *Ibid.*, pp. 321-322. Speaking of this same sort of habitual knowledge, St. Thomas says: "...nullus unquam erravit in hoc quod non perciperet se vivere, quod pertinet ad cognitionem qua aliquis singulariter cognoscit quid in anima sua agatur; secundum quam cognitionem dictum est, quod anima per essentiam suam cognoscitur in habitu. Sed error apud multos accidit circa cognitionem naturae ipsius animae in specie.." *Ibid.*, *ad 2um*, p. 324. See also, *ST* I, q. 87, a. 1, vol. 5, p. 356. Putallaz takes this habitual knowledge to be a condition for the possibility of the soul's actual knowledge of itself. He says, "...la connaissance habituelle de soi apparaît sans nul doute comme une condition de possibilité de la conscience actuelle de soi, condition qui n'est jamais donée dans l'expérience, mais que le philosophie peut découvrir par une analyse." From his, *Le Sens de la Réflexion chez Thomas D'Aquin*, p. 95. Similarly, Richard Lampert maintains: "...habitual knowledge guarantees continuity in actual experience of the soul. One could not truly be said to perceive 'one's soul' unless the same soul were apprehended in every such perception. If one perceives 'one's soul' over a lifetime, there must be a continuity in the

Our point here, then, is simply this: just as a man grasps that he has a soul, and is alive, and is because "he perceives himself to sense and to understand and to exercise other similar vital acts," so too a man can defend his natural judgement that he is an undivided substance, at least in part, by appealing to the fact that "he perceives himself to sense and to understand and to exercise similar vital acts."[56]

Lastly, it is worth noting that in response to those who deny the reality of the subject matter of natural philosophy, Aristotle says: "It must be granted by us that either all or some natural things are moving. This is clear from induction."[57] Now it is already evident to everyone who is untroubled by various philosophical difficulties that mobile being exists. Nevertheless, in saying, "This is clear

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soul itself and in the means of knowing it. The soul, as the defining factor of continually self-identical substance which is the human person, does remain the same throughout a human lifetime; and habitual knowledge guarantees a real contact with the soul itself." From, "Habitual Knowledge of the Soul in Thomas Aquinas," *The Modern Schoolman* 60 (1982), p. 12.

An important possible parallel text to *De Veritate* q. 10, a. 8 is the *Questio de immortalitate animae.* This text can be found in Leonard Kennedy, "The Soul's Knowledge of Itself: An Unpublished Work Attributed to St. Thomas Aquinas," *Vivarium* 15, 1 (1977), pp. 31-45. Doctrinally speaking, this text does not seem to clarify or help us to understand further what St. Thomas teaches about the actual or habitual knowledge which a particular soul has of itself. Putallaz thinks that this text was not penned by St. Thomas. For his reasons, see *Le Sens de la Réflexion chez Thomas D'Aquin*, pp. 305-310.

[56] Lest one think that this way of defending our natural judgement that we are undivided substances is not Thomistic or that this approach is unrelated to scientific knowledge, we need only recall what St. Thomas says regarding how this knowledge of the soul is related to the science of the soul. He writes: "...dicendum quod secundum hoc scientia de anima est certissima, quod unusquisque in se ipso experitur se animam habere, et actus animae sibi inesse; sed cognoscere quid sit anima, difficillimum est." *De veritate*, q. 10, a. 8 *ad 8um*, vol. 22, p. 325. In *In de Anima*, Bk. 1, *capitulum* 1, vol. 45, p. 5, St. Thomas says that the science of the soul is certain since, "hoc...quilibet experitur in seipso, quod scilicet habeat animam, et quod anima vivificet.." In both of these texts it seems clear that St. Thomas is defending the existence of the subject matter of the science of the soul by appealing to the sort of knowledge of the soul just mentioned in *De veritate*, q. 10, a. 8. Regarding this matter, Putallaz says, "La conscience préréflexive va jusqu'à la manifestation de l'*existence* de l'âme (*an sit*) et permet de poser la question de sa *nature* ou de sa *quiddité* (*quid sit*)...," *Le Sens de la Réflexion chez Thomas D'Aquin* , p. 112, n. 27.

[57] *Physics*, Bk. 1, ch. 2, 185a14-a15. On this text, St. Thomas comments as follows: "In scientia naturali supponitur quod naturalia moveantur vel omnia vel quaedam: quod dicit quia de quibusdam est dubium si moventur et qualiter moventur, puta de anima, de centro terrae, de polo caeli, et formis naturalibus, et aliis huiusmodi. Et quod naturalia moveantur, potest manifestum esse ex inductione; quia ad sensum apparet quod res naturales moventur. Est autem necessarium motum supponi in scientia naturali, sicut necessarium est supponi naturam, in cuius definitione ponitur motus; est enim natura principium motus, ut infra dicetur." *In de Phys.*, Bk. 1, *lectio* 2, vol. 2, p. 9.

from induction," Aristotle is showing his reader the basis that we all find in our common experience for affirming that the statement, "Mobile being exists," is in fact true. In a very similar way, we maintain that it is *per se notum quoad omnes* that the natural substances which are most known to us are undivided substances, of really different kinds, which are involved in substantial becoming (i.e., either as that to which substantial becoming is attributed or as that at which substantial becoming terminates). Nonetheless, due to the difficulties raised above by *Monism* and *Pluralism*, it became incumbent on us to show to our reader the basis that we all find in our common experience for knowing that the statement, "the natural substances most known to us are undivided substances, of really different kinds, which are involved in substantial becoming (i.e., either as that to which substantial becoming is attributed or as that at which substantial becoming terminates)," is in fact true.

The third and final objection that we shall here consider is taken from David Hume. In *A Treatise of Human Nature*, Hume attempts to show that we are incapable of knowing ourselves to be substances. If we have an idea of the "self," says Hume, then there must be some corresponding impression from which this idea is derived. Yet, regarding this supposed impression, Hume goes on to query:

> For, from what impression could this idea be derived? This question it is impossible to answer without a manifest contradiction and absurdity; and yet it is a question which must necessarily be answered, if we would have the idea of self pass for clear and intelligible. It must be some one impression that gives rise to every real idea. But self or person is not any one impression, but that to which our several impressions and ideas are supposed to have a reference. If any impression gives rise to the idea of self, that impression must continue invariably the same, through the whole course of our lives; since self is supposed to exist after that manner. But there is no impression constant and invariable. Pain and pleasure, grief and joy, passions and sensations succeed each other, and never all exist at the same time. It cannot therefore be from any of these impressions, or from any other, that the idea of self is derived; and

consequently there is no such idea.[58]

The essence of Hume's argument here seems to come to this: whatever impression gives rise to the idea of the self must be the same throughout the whole course of our lives. But no impression is the same throughout the whole course of our lives. Therefore, no impression gives rise to the idea of the self. This argument seems to imply necessarily, then, that no man truly knows himself to be an undivided substance since the very idea of the self is not rooted in man's sense experience.

Now it is important to note that Hume's argument against our purported knowledge of ourselves is largely a particularized version of his more general rejection of the empirical origin of our ideas of substance and accident. Hume addresses our idea of substance towards the beginning of *A Treatise of Human Nature*. He writes:

> I would fain ask those philosophers, who found so much of their reasonings on the distinction of substance and accident, and imagine that we have clear ideas of each, whether the idea of *substance* be derived from the impressions of sensation or reflection? If it be conveyed to us by our senses, I ask, which of them, and after what manner? If it be perceived by the eyes, it must be a colour; if by the ears, a sound; if by the palate, a taste; and so of the other senses. But I believe none will assert, that substance is either a colour, or sound, or a taste. The idea of substance must, therefore, be derived from an impression of reflection, if it really exist. But the impressions of reflection resolve themselves into our passions and emotions; none of which can possibly represent a substance. We have, therefore, no idea of substance, distinct from that of a collection of particular qualities, nor have we any other meaning

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[58] *A Treatise of Human Nature*, vol. I (New York: E.P. Dutton & Co., Inc., 1951), pp. 238-239. After this Hume proceeds to present his well known "bundle theory" of the self. He states: "For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch myself at any time without a perception, and never can observe anything but a perception... If any one, upon serious and unprejudiced reflection, thinks he has a difference notion of himself, I must confess I can reason no longer with him. All I can allow him is, that he may be in the right as well as I, and that we are essentially different in this particular. He may, perhaps, perceive something simple and continued, which he calls himself; though I am certain there is no such principle in me.

But setting aside some metaphysicians of this kind, I may venture to affirm of the rest of mankind, that they are nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement." *Ibid.*, p. 239.

when we talk of reason concerning it.[59]

Corresponding to this is Hume's position on our idea of accident. Regarding this he says:

> The notion of *accidents* is an unavoidable consequence of this method of thinking with regard to substances and substantial forms; nor can we forbear looking upon colours, sounds, tastes, figures, and other properties of bodies, as existences, which cannot subsist apart, but require a subject of inhesion to sustain and support them. For having never discovered any of these sensible qualities, where, for the reasons above mentioned, we did not likewise fancy a substance to exist; the same habit, which makes us infer a connection betwixt cause and effect, makes us here infer a dependence of every quality on the unknown substance. The custom of imagining a dependence has the same effect as the custom of observing it would have. This conceit, however, is no more reasonable than any of the foregoing. Every quality being a distinct thing from another, may be conceived to exist apart, and may exist apart not only from every other quality, but from that unintelligible chimera of a substance.[60]

According to Hume, then, inasmuch as substance is not the proper object either of any of the external senses or of reflection, our idea of substance cannot have its origin in our sense experience. Hence, he maintains that we have no empirical foundation on which to base our claim that substances actually exist. But if this is so, then our idea of accident must be chimerical as well. That is, since accidents as such are beings which are in substances as in subjects, then if we have no basis in our experience to say that there are any substances, we must likewise lack an experiential basis for maintaining that

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[59] *Ibid.*, p. 24. After the text just quoted, Hume goes on to give the following account of our idea of substance: "The idea of a substance as well as that of a mode, is nothing but a collection of simple ideas, that are united by the imagination, and have a particular name assigned them, by which we are able to recall, either to ourselves or others, that collection. But the difference betwixt these ideas consists in this, that the particular qualities which form a substance, are commonly referred to an unknown *something*, in which they are supposed to inhere; or granting this fiction should not take place, are at least supposed to be closely and inseparably connected by the relations of contiguity and causation. The effect of this is, that whatever new simple quality we discover to have the same connection with the rest, we immediately comprehend it among them, even though it did not enter into the first conception of the substance. Thus our idea of gold may at first be a yellow colour, weight, malleableness, fusibility; but upon the discovery of its dissolubility in *aqua regia*, we join that to the other qualities, and suppose it to belong to the substance as much as if its idea had from the beginning made a part of a compound one. The principle of union being regarded as the chief part of the complex idea, gives entrance to whatever quality afterwards occurs, and is equally comprehended by it, as are the others, which first presented themselves." *Ibid.*, pp. 24-25.

[60] *Ibid.*, p. 213.

there are accidents. As a result, we should think of the beings which we normally name "accidents" as beings which do not need to exist in another as in a subject.

From these considerations it is easy to see the consistency between Hume's views on substance and the self. For just as he maintains the former to be nothing other than "a collection of particular qualities," so too he holds the latter to be "nothing but a bundle or collection of different perceptions."

Our response to Hume's position will be in two parts. First, we shall follow out the necessary consequences of Hume's position on substance and, thereby, reduce it to absurdity. Second, we shall attempt to locate and expose the fundamental error which is common both to his position on substance and to his position on the self. In order to pursue the first of this parts, we cannot do better than quote Richard Connell. He states:

> Let is be supposed that Hume is right: no substratum underlies the qualities we observe. And let it also be supposed that the qualities are real and do exist outside the knower, for we cannot forget our realist presupposition. From these premisses it then follows that the qualities cannot be modifiers, they cannot be accidents according to the Aristotelian notion; for modifiers exist in another as in a subject. If, however, the qualities do exist, and if they do not exist in a substratum, as Hume claims, then they must exist independently of a subject; for there is no third alternative. Hume actually takes the position that the qualities exist but not in another as in a subject. To do that, however, is to endorse the definition of *substance*, from which one may conclude that Hume's qualities must now be regarded as *substances in the Aristotelian sense*. What it all comes to is that Hume has denied the reality of Aristotle's accidents by turning them into substances, and he explicitly concedes what has just been claimed when he says: "Every quality being a distinct thing from another, may be conceived to exist apart, and may exist apart not only from every other quality, but from that unintelligible chimera of a substance." What could be clearer? Qualities may be conceived to exist apart. And so Hume would appear not to realize what he has done. By failing to pay careful attention to the definition of substance, he has supported it in a backhanded way.[61]

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[61] Richard Connell, "An Empirical Consideration of Substance," *Laval Theologique et Philosophique* 34 (1978), pp. 244-245. Unwilling to spare Hume's position, Connell continues as follows: "As a second illustration let

It is clear from this text that Hume's denial of the existence of substance and, thus, of the dependence of what we call "accidents" on substance, necessarily implies not only that there are substances, but also that, according to Hume, there are many more substances than Aristotle or St. Thomas would ever dream of admitting. Hence, in Connell's words, "Hume succeeds only in destroying accidents by making them into substances, and this final state of affairs is worse for him than the first."[62]

Nor does Hume's position on the self fare any better than his position on substance. For, given the foregoing, Hume's position necessarily implies that every quality (and perhaps even every perception) which belongs to a man is itself a substance. That is, since what we normally conceive to be "accidents" are no longer such on Hume's view, but rather are substances, it must be the case that every quality which a man perceives to belong to himself (and perhaps every perception by which he perceives these qualities) is in fact a substance. Hence, Hume's understanding of man as "nothing but a bundle or collection of different perceptions" necessarily implies that man is "nothing but a bundle or collection of different substances." Here too Hume's "final state of affairs is worse for him than the first."

Turning to the second part of our response, the fundamental error which is common both to

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us suppose that the shape and the motion of a billiard ball are qualities-become-substances. From this supposition it then follows that the motion of the ball must be distinct and separate from the shape and that the motion must be united to the shape exteriorly; that is, the motion must be united to the shape in the way in which an arm is joined to its body and one freight car to another; for the only other alternative, which is absurd, is to conceive substances as interpenetrating one another....On the other hand, if the motion is exterior to the shape, then what happens when the "ball" moves? Does the motion pull the shape along like an appendage? If so, then the shape moves too, and there is not one motion but two, which means that the number of motions in the "ball" will be equal to the number of qualities-become-substances in the collection. Moreover, every motion but the first will reside in other traits and will be accidents or modifiers of the traits. But if the motion does not pull the shape along, then shape and motion must become constantly more separated, and the "ball" could hardly be said to move. Now the absurdity of both of these alternatives is obvious, yet both follow necessarily from the supposition that the apprehended qualities do not inhere in a subject and are independent entities." *Ibid.*, p. 245.

[62] *Ibid.*, p. 245.

Hume's position on substance and to his position on the self is his failure to recognize our knowledge of what is sensible *per accidens* as well as our experiential knowledge of what is not sensible at all. Regarding the first of these, Hume seems to think that either something is sensible *per se* or it cannot be called "sensible" at all. That is, according to Hume, either something acts on the external senses in virtue of itself, or it does not act on the external senses in any way at all. This way of understanding the nature of the sensible, however, both fails to recognize a third logical possibility (i.e., that something could be called "sensible" not *per se*, but because it happens to what is sensible *per se* and is grasped *per se* as soon as what is sensible *per se* acts upon the external senses) and, more importantly, fails to comport with our common experience.[63] For it is incontrovertible that we have sense experience of things which we can term "sensible *per accidens*" such as Mr. Smith. In other words, I can truly say, "I see Mr. Smith," since whenever I see his shape, color, motion, and so forth, I am simultaneously aware, through these accidents acting on my sense of sight in virtue of themselves, that these accidents inhere in the substance whom I name "Mr. Smith."

Regarding our experiential knowledge of what is not sensible at all, it seems that Hume fails to recognize this kind of knowledge since he seems to think that in order for something to be a matter of experience it has to be known *per se* to the senses. St. Thomas, however, does not suffer from this

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[63] Regarding this second point, Michael Augros lucidly presents our common experience in the following text: "'What we can 'imagine' has more than one sense, just as 'what we can see' has more than one sense. I can see colors and shapes and motions in one sense, and in another sense I can see things to which these belong – as when I say 'I see my son.' My son is not a color or shape or motion, but when I see his colors, shapes, and motions, I am simultaneously aware of him as the subject of these, and so I say that 'I see him,' although he makes no separate impression upon my eye over and above his colors, shapes, and motions through which I am aware of him. Similarly, I can imagine shapes and colors and motions in one sense, but in another sense I can say that I imagine the things to which these belong – such as my children – although I form no separate image for these over and above those for their shapes, colors, and motions. Things such as shapes, colors, and motions are said to be imagined *per se*, or in themselves, whereas things like my children are said to be imagined *per accidens*, since we form no separate image for these, but rather these are imagined through imagining the things that belong to them." From his, "Ten Objections to the 'Prima Via,'" *Peripatetikos* 6 (2007), p. 81.

same delusion. On the contrary, he teaches:

> ...it must be said that the beginning of human knowledge is from sense. However, it is not necessary that whatever is known by man be subject to sense or be known immediately through a sensible effect. For the intellect itself knows itself through its act which is not subject to sense. Similarly, it also knows the interior act of the will insofar as the will is in some way moved through the act of the intellect and in another way the act of the intellect is caused by the will, as has been said, just as an effect is known through a cause, and a cause through an effect.[64]

Now if we were correct above in maintaining that it is precisely through a kind of experiential knowledge as St. Thomas speaks of here that each man can understand himself to have a soul, to be an undivided substance, and so on, then had Hume not denied that we have this sort of experiential knowledge of what is not sensible at all, perhaps he would not have so quickly denied our ability to know ourselves as substances.

In sum, then, if Hume had recognized that we know what is sensible *per accidens* and that we have an experiential knowledge of what is not sensible at all, it seems that the perceptions which he finds in himself and the sensible qualities which he finds in billiard balls would not have been obstacles to his knowing either his own substance or the substances of other things. On the contrary, Hume would have seen that these same perceptions and qualities are the very windows, as it were, through which we are able to see both ourselves as substances and the substances of other things.

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[64] "...dicendum quod principium humanae cognitionis est a sensu; non tamen oportet quod quidquid ab homine cognoscitur, sit sensui subiectum, vel per effectum sensibilem immediate cognoscatur. Nam et ipse intellectus intelligit seipsum per actum suum, qui non est sensui subiectus; similiter etiam et interiorem actum voluntatis intelligit, in quantum per actum intellectus quodammodo movetur voluntas, et alio modo actus intellectus causatur a voluntate, ut dictum est, sicut effectus cognoscitur per causam, et causa per effectum. *De malo*, q. 6 *ad* 18*um*, vol. 23, p. 152. Regarding this as involving a kind of experiential knowledge, St. Thomas writes: "illa quae sunt per essentiam sui in anima, cognoscuntur experimentali cognitione, inquantum homo experitur per actus principia intrinsica: sicut voluntatem percipimus volendo, et vitam in operibus vitae." *ST* I-II, q. 112, a. 5 *ad* 1*um*, vol. 7, p. 327. Commenting on *De malo* text, Fr. Dewan states: "This reply reveals a conception of intellect and its relation to sense which is worlds apart from what is often called 'empiricism.'" *Form and Being*, p. 120.

## 6. Résumé

Given what was established in chapter three, it was necessary for us to delineate certain sensible attributes or properties which belong to the natural substances which are most known to us as principles from which to come to know the nature(s) of the inward principles and causes of these same natural things. Yet, in light of the arguments raised by *Monism* and *Pluralism* in chapter two, our understanding of the most natural candidates for this role (i.e., the substantial unity of the natural substances most known to us, their real differences in kind, and the reality of substantial becoming itself) seemed somewhat doubtful or, at least, in need of a certain defense. In this chapter, accordingly, we attempted to defend the veracity of our natural judgements concerning these three things.

After initially distinguishing between what is sensible *per se* and what is sensible *per accidens*, we pointed out that our natural judgements concerning the substantial unity of the natural substances which are most known to us are judgements which are about what is sensible *per accidens*. By slight contrast, our natural judgments about the differences in kind amongst these substances and about the substantial becomings that these substances are involved in (i.e., either as that to which substantial becoming is attributed or as that at which substantial becoming terminates) are judgements which are about what is rooted in that which is sensible *per accidens*. With these distinctions in mind, we then attempted to show that our natural judgements concerning these matters are not "'flat earth' errors,"but rather are firmly grounded in our common experience of the natural world.

Thus, we argued that, by "doubling back" to his common experience, each man can not only understand himself to be an undivided substance, but he can also understand his fellow men,

familiar brute animals, and familiar plants to be undivided substances as well. In a similar way, by looking back to the profound differences between the kinds of activities or operations which belong to men, brute animals, and plants, we argued that one can defend the claim that these same substances must differ profoundly in terms of what they are. Likewise, we maintained that it is through attending to the coming into being or the passing away of certain sensible properties which belong to the men, brute animals, and plants (as well as to the substances which exist both before and after these substances in time) what we can be assured of the reality of substantial becoming in the world around us.

Lastly, we raised and responded to three objections which could reasonably be brought against what we established in this chapter. Hence, we observed that, despite our sometimes mistaken judgements concerning the three aforementioned things, despite each man's reliance on his own internal or, in some sense, subjective experience in order to make the judgement that he is one substance, and despite Hume's denial of our ability to know ourselves as undivided substances, nevertheless, it is true to maintain that our natural judgements regarding the substantial unity of the natural substances most known to us, their real differences in kind, and the reality of substantial becoming itself are truly known to us from our sense experience.

## Chapter Five: The Ancient and Modern Answers Revisited

Toward the end of chapter two we found ourselves faced with what seemed to be an insoluble dilemma. For there we observed that the proponents of both *Monism* and *Pluralism* seem to show quite definitively that if we are to have a true answer to the question, *Quid sint principia naturae*?, we must finally abandon what we understand from our common experience regarding the substantial unity of natural substances which are most known to us, their real differences in kind, as well as the reality of the substantial becomings which we think they are involved in. Or, to put it another way, the proponents of *Monism* and *Pluralism* seem to demonstrate that there is a fundamental contradiction latent in these three things which we claim to know from our common experience. For, these philosophers seem to show that it is impossible to hold that the natural substances which are most known to us are undivided substances of many different kinds which change into one another. Hence, the proponents of *Monism* and *Pluralism* maintain that either we must abandon a great deal of what we know from our common experience of the natural world for the sake of having a true answer to the question, *Quid sint principia naturae*?, or we must abandon a true understanding of the *principia naturae* for the sake of preserving a great deal what we think we know from our common experience of the natural world.

Thus, it was in response to this seemingly insoluble dilemma that we were prompted to inquire into the nature of the proper *modus procedendi* which must be followed, if we are to give a true answer to the question, *Quid sint principia naturae*? This, in turn, led us to examine how we know from our sense experience that the natural substances which are most known to us are indeed undivided substances of really different kinds which are involved in substantial becoming (i.e., either as that to which substantial becoming is attributed or as that at which substantial becoming

terminates). Since at this point, we have examined these matters in some detail, we are now in a good position to revisit and respond to *Monism*, *Pluralism*, and the seemingly insoluble dilemma which these two positions jointly set forth. But in order that we might do this well, we shall aim at accomplishing two chief things in this chapter. First, we shall attempt to make clear some of the ways in which *Monism* and *Pluralism* have failed to follow the proper *modus procedendi* laid out in chapter three. Connected with this, we shall show what effects this failure has for *Monism*, *Pluralism*, and the seemingly insoluble dilemma which these positions jointly set forth. Second, we shall attempt to indicate how it is that both *Monism* and *Pluralism* help us to see in a general and confused way what the true answer to the question, *Quid sint principia naturae*?, most probably is.[1]

## 1. Revisiting the Three Arguments of *Monism* and *Pluralism*

Now in our attempt to make clear some of the ways in which *Monism* and *Pluralism* have failed to follow the proper *modus procedendi* laid out in chapter three, let us first bring explicitly before our minds three contradictions. In chapter two, we saw three arguments which captured well certain implications of both *Monism* and *Pluralism*. Here, again, are those same three arguments:

> No becoming in which the material principle is some substance(s) is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.
> But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).

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[1] As will become clear below, this second aim of the chapter will entail us using both induction and dialectic. For general treatments of both of these logical tools in Aristotle, see: J.D.G. Evans, *Aristotle's Concept of Dialectic* (Cambridge: Cambridge University Press, 1977), Michael Ferejohn, *The Origins of Aristotelian Science* (New Haven: Yale University Press, 1980), Terence Irwin, *Aristotle's First Principles* (Oxford: Clarendon Press, 1988), esp. pp. 26-50, and Russell Winslow, *Aristotle and Rational Discovery* (New York: Continnum, 2007), esp. pp. 19-23.

Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.

No becoming in which the material principle is some substance(s) is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.
But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).
Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.

No becoming in which the material principle is some substance(s) is indeed a substantial becoming.
But, according to *Monism* and *Pluralism*, every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).
Therefore, according to *Monism* and *Pluralism*, no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is indeed a substantial becoming.

But in Chapter Four we constructed the following three arguments from various things which are known to us from our sense experience:

Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.
But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
Therefore, some becomings which we think are substantial becomings are becomings

in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance.

Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.
But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
Therefore, some becomings which we think are substantial becomings are becomings in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind.

Every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is indeed a substantial becoming.
But every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself is a becoming which we think is a substantial becoming.
Therefore, some becomings which we think are substantial becomings are indeed substantial becomings

Now it is clear that all six of these syllogisms are valid. Yet, the conclusions of the first and third syllogisms, of the second and fourth syllogisms, and of the third and six syllogisms all stand to each other as contradictory statements or propositions (i.e., as universal negative statements stand to particular affirmative statements). Hence, it is clear that three of these conclusions are false and three of them are true.

But, given what was established in chapter four, it should be evident that the conclusions of the last three syllogisms are in fact true. For in that chapter we manifested precisely how it is that, from our sense experience, we see that the major premises of these three syllogisms are true. Further, all three of the minor premises of these syllogisms are but statements of what we all naturally think is the case regarding certain becomings.

But given the valid mood of these last three syllogisms and given the truth of both their major

and minor premises, it must be the case that the conclusions of these last three syllogisms are in fact true. As a result, we can say that the conclusions of the first three syllogisms are false statements.

But, since all three of these syllogisms have valid moods, the falsehood of these three conclusions must be caused by at least one false premise in each of these first three syllogisms. Now it is not difficult to see that the three major premises of the first three syllogisms are all true. For we saw in chapter two that each of these premises focuses on a certain effect which really does follow from the supposition that what underlies a becoming is some substance(s). As a result, it appears that the false premises are none other than three minor premises of the first three syllogisms.

Now, as was made clear in chapter two, what is common to all three of these minor premises is that they all affirm that every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s). Noting this, we can make more precise the reasoning which was just presented above. That is, we can refine and reformulate the argument presented above using the following hypothetical syllogism: If every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s), then (1) no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance, (2) no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or

assimilates food to itself) is a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind, and (3) no becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is indeed a substantial becoming. But, we know that (1), (2), and (3) are in fact false. For in chapter four it was manifested that we know the contradictories of (1), (2), and (3) to be true. Hence, it is false to maintain that every becoming which we think is a substantial becoming (i.e., every becoming in which a man, familiar animal, or familiar plant, comes to be, ceases to be, or assimilates food to itself) is a becoming in which the material principle is some substance(s).[2]

Now, by this point, it should be clear that this way of reasoning about the nature of the material principle in substantial becoming is in keeping with the proper *modus procedendi* set forth in chapter three. For here we are proceeding from a knowledge of the existence and natures of certain effects to a knowledge of what the nature of the cause of these effects cannot consist in. In other words, here we are coming to see what the nature of the material principle in substantial becoming is not by depending on our prior understanding of the existence and natures of the proper effects of this same material principle. But, as we saw in chapter three, to proceed in this way is necessary for us since these aforementioned effects are in some way more known to us than are the nature(s) of the inward principles and causes of the natural substances which are most known to us (these latter, in turn, are more knowable simply speaking). Thus, it is clear that by proceeding this way we are moving from what is more known to us but less knowable simply speaking to what is

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[2] It should be clear that this argument against *Monism* and *Pluralism* is nothing other than a more formal presentation of what was termed in chapter two the "most natural response" to these positions.

less known to us but more knowable simply speaking.

But if the above mentioned way of reasoning about the nature of what underlies substantial becoming is in accordance with the proper *modus procedendi*, then what must we say about the way of proceeding to the nature of this same material principle which we find to be common to the ancient and modern answers examined in chapter two? For this latter way of proceeding is in some measure clearly opposed to the former way of proceeding.

In response to this, perhaps it is not unreasonable to maintain that the way of proceeding which we find in the ancient and modern answers is in some way "preposterous." For it mixes up what is before in our knowledge with what is after in our knowledge.[3] More specifically, this way of proceeding seems to maintain that our coming to understand the nature(s) of the inward principles and causes of the natural substances most known to us does not finally depend on our prior understanding of the substantial unity of the substances involved in substantial becoming, the differences in kind amongst the substances involved in substantial becoming, and the reality of substantial becoming itself. Rather, this way of proceeding seems to assume that we can come to understand the nature(s) of these inward principles and causes not only in some way apart from, but also at the expense of our prior understanding of their proper effects. In other words, this way of proceeding seeks to travel over the *via compositionis* without having first properly or fully traversed the *via resolutionis*. And it is here that we find a mixing up of what is before in our knowledge with what is after in our knowledge (and finally even an identification here between what is more known

[3] Cf. Duane Berquist's, "The First Definition of Reason," *Philosophia Perennis* 3(1996), p. 65.

to us and what is more knowable simply speaking).[4]

But since, in truth (as we saw in chapters three and four), these aforementioned attributes or properties of the natural substances which are most known to us are the very things on which our coming to understand the nature(s) of the inward principles and causes of these same natural substances essentially depends, it follows that to deny the reality of these attributes or properties is finally to deny the reality of our knowledge of the nature(s) of the inward principles and causes of the natural substances which are most known to us.[5] Hence, it is quite manifest that the way of proceeding which we find to be common to the ancient and modern answers examined in chapter two involves at least one serious violation of the proper *modus procedendi* which must be followed, if we are to come to a true answer to the question, *Quid sint principia naturae*?

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[4] Charles De Koninck points out that a similar mistake is made by modern biologists who maintain that we ought to begin our study of the animate by looking at the most basic living things and understanding every other living thing in terms of them. Now these biologists proceed in this way because of a certain misunderstanding that they have of the principle that we ought to understand the more complex in terms of the more simple. De Koninck writes, "Is it not a general principle of science that we must try to explain the complex in terms of what is at least less complex? Now a horse, or a philosopher, is more complex than an amoeba, and should not therefore be studied until the simpler organism has been taken care of. But this difficulty is easily met. Though far more complex than the amoeba, the horse, in a sense is far more known to us; and a dead horse far more recognizably dead than a dead amoeba." *The Hollow Universe*, pp. 82-83. It seems that a similar mistake is being made here by our ancient and modern authors.

[5] We can explain the reason given here a bit more clearly as follows: Even though the nature(s) of the inward principles and causes of the natural substances which are most known to us stand to the above mentioned attributes or properties as cause to effect in the order of being, nonetheless, these same attributes or properties stand to the nature(s) of the inward principles and causes of the natural substances which are most known to us as cause to effect in the order of our coming to know. But to remove either a particular cause in act or a particular effect in act is to remove its particular effect in act or its particular cause in act, respectively. Hence, just as removing from reality the nature(s) of the inward principles and causes of the natural substances which are most known to us would also necessitate removing from reality the attributes or properties which follow from these, so too removing from our minds an understanding of the attributes or properties of these natural substances would necessitate removing from our minds an understanding of the nature(s) of the inward principles and cause of these same natural substances.

This way of proceeding which is here followed by the ancients and moderns seems to involve a version of what Ralph McInerny calls the "Hang on to the brush, I'm taking away the ladder" style argument. See his *A First Glance at St. Thomas Aquinas: A Handbook for Peeping Thomists* (South Bend, IN: University of Notre Dame Press, 1990), p. 69.

## 2. Revisiting the Fundamental Argument of *Monism* and *Pluralism*

Now, at this point, one might wonder about the argument which the proponents of *Monism* and *Pluralism* set forth which seemed to necessitate that we deny the reality of the substantial unity of natural substances which are most known to us, their real differences in kind, as well as the reality of substantial becomings which we think these substances are involved in. In other words, it will be recalled that in chapter two the proponents of *Monism* and *Pluralism* did not posit without reason that we are deceived vis à vis those things which we think we know from our common experience of the natural world. The essence of their argument for this was the following: whenever this substance of this kind becomes that substance of that kind, some material principle changes from being this substance of this kind to being that substance of that kind. Now this material principle is either a non-substance or a substance. But this material principle cannot be a non-substance. For if it were, then a non-substance would become a substance and, therefore, it would be true to say that "a non-substance is a substance," which is absurd. Further, if the material principle were a non-substance, then the material principle would really be nothing (for it would be neither a substance nor some accident[s]), and, hence, we would be forced to posit a becoming which has nothing that underlies it. But a becoming in which there is nothing which becomes is impossible. Hence, it is clear that the material principle in question cannot be a non-substance. But since non-substance and substance are opposed as contradictories, if the material principle in question is not a non-substance, then it must be a substance.[6]

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[6] Furthermore, the proponents of *Monism* and *Pluralism* might point out that whenever we attempt to imagine what underlies the becoming of the natural substances which are most known to us, we always imagine some determinate kind of substance to be the material principle in question. To be more specific, these ancient and modern views hold that the substance(s) in question is/are none other than the element(s). Hence, Thales says that there is only one such substance which underlies so called "substantial becoming" and it is water. By contrast, Empedocles says that there are many such substances, to wit, fire, air, water, and earth. Democritus holds that these

But if the material principle in question is a substance, then the becoming which this material principle underlies must be an accidental becoming. For whenever a substance underlies a becoming, the substance in question only changes from being in this respect to being in that respect. Hence, we must hold that the becomings which, thanks to our common experience, we perceive to be substantial in nature, are in truth only accidental becomings. That is, whenever we think we see this substance of this kind becoming that substance of that kind, what is really occurring is that some substance is merely changing from being in this respect to being in that respect. But if it is true that every supposed substantial becoming is, in truth, only an accidental becoming, then we also have to maintain that neither that to which every such becoming is attributed nor that at which every such becoming terminates is, taken precisely as such, one substance. Similarly, we have to deny that that to which every such becoming is attributed and that at which every such becoming terminates truly differ in kind.

How, then, are we to respond to this argument from the proponents of *Monism* and *Pluralism*? Given what has been established in chapters three and four, it seems true to say that we know *that* this argument is not in fact demonstrative. For if it were demonstrative, then, as was shown in chapter two, (1) no becoming which we think is a substantial becoming would be a becoming in which either that to which the becoming is attributed, taken precisely as such, or that at which the becoming terminates, taken precisely as such, is one substance, (2) no becoming which we think is a substantial becoming would be a becoming in which that to which the becoming is attributed and that at which the becoming terminates really differ in kind, and (3) no becoming which

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substances are the infinitely many atoms and the infinitely expansive void. Similarly, Anaxagoras thinks that these substances in question are none other than the infinite number of infinitely small bits of every homogeneous substance.

we think is a substantial becoming would indeed be a substantial becoming. But, again, we know from our common experience that the contradictories of all three of these consequents are in fact true. Or, to put essentially the same point somewhat differently, we can say this: *contra* the proponents of *Monism* and *Pluralism*, we know that there is no fundamental contradiction latent in the three things which we claim to know from our common experience. That is, we know that there is no impossibility involved in maintaining that the natural substances which are most known to us are undivided substances of many different kinds which change into one another. For if there were, the same consequents would necessarily follow. But, again, we know that such consequents are false. As a result, it is clear *that* the argument set forth by the proponents of *Monism* and *Pluralism* is not demonstrative.

Yet, *wherein* lies this argument's flaw? *Why* is it not demonstrative? At this point, the *cause* of its failure to demonstrate is unclear to us. That is, it is not clear to us precisely how the reality of the substantial unity of natural substances which are most known to us, their real differences in kind, as well as the reality of the substantial becomings which we think these substances are involved in actually fit together, so to speak, so as not to involve any contradiction. Despite this, it seems reasonable to maintain that we will be able to see how these things fit together once we have successfully followed the proper *modus procedendi* and have arrived at the true answer to the question, *Quid sint principia naturae*?. Furthermore, once it has been shown how these three things fit together, then, contrary to what the proponents of *Monism* and *Pluralism* maintain, we shall neither be forced to sacrifice a great deal of what we know from our common experience for the sake of understanding of the *principia naturae* nor be forced to sacrifice our understanding of the *principia naturae* for the sake of preserving a great deal of what we know from our common

experience. For the apparent opposition between understanding the *principia naturae* and maintaining what is known to us from our common experience only arises because of the apparent incompatibility of the three aforementioned things.[7]

Now before we attempt to indicate how it is that both *Monism* and *Pluralism* help us to see in a general and confused way what the true answer to the question, *Quid sint principia naturae*?, most probably is, perhaps it would be worthwhile to note a second way in which *Monism* and *Pluralism* fail to observe the proper *modus procedendi* laid out in chapter three. In observing that the material principle in every change which we take to be a substantial becoming consists in some substance(s), the proponents of *Monism* and *Pliuralism* quite naturally see that this material principle has the status of a *principium naturae*. Upon seeing this, however, rather than asking the more general and more fundamental question, "How many general kinds of principles of nature are there?," the proponents of *Monism* and *Pluralism* seem to be immediately concerned with answering the more specific and less fundamental question, "What is the precise nature of the principle and cause which underlies the changes which we take to be substantial becomings?" For they immediately hasten to ask whether this material principle is water, or the four elements, or some other specific kind(s) of substance(s).

But this, in itself, seems to involve a certain failure to observe the proper *modus procedendi*, inasmuch as it involves a failure to move from a more general determination of the nature(s) of the *principia naturae* to a more specific determination of these same principles and causes. In contrast to this, one ought to determine, first of all, how many general kinds of *principia*

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[7] The complete untying of this knot will have to wait until the end of chapter seven. For it is only after we have successfully traveled over both the *via resolutionis* and the *via compositionis* that we shall be in a proper position to see how these three things known from our common experience fit together.

*naturae* there are which are responsible for the change of this substance of this kind into that substance of that kind. Thereafter, and in light of this earlier determination, one should proceed to determine the precise nature of these same *principia naturae*. For only in proceeding in this way does the one who is seeking an understanding of the natures of the *principia naturae* respect the natural order in our knowledge, which proceeds from the more general and indistinct to the more specific and distinct.

Thus far in this chapter we have located two ways in which *Monism* and *Pluralism* fail to follow the proper *modus procedendi* laid out in chapter three. In addition, we have seen in some detail how the first way of failing to follow the proper *modus procedendi* has resulted in the undoing of both *Monism* and *Pluralism* as plausible answers to the question, *Quid sint principia naturae*? Having attended to this, we shall now attempt to indicate how it is that both of these positions help us to see in a general and confused what the true answer to the question, *Quid sint principia naturae*?, most probably is. Let us begin to do this by asking the general question which we claimed above was somewhat neglected or overlooked by the proponents of *Monism* and *Pluralism*. That is, having in mind the particular theories which fall under these positions, let us ask this: "How many general kinds of principles of nature are there, according to *Monism* and *Pluralism*?"

### 3. Answering the Question *Per Modum Disputationis*

At first glance the answer to this question appears to be altogether obvious. For in chapter two we saw that the proponents of both *Monism* and *Pluralism* all seem to agree that there is only one kind of *principium naturae*, namely, that which underlies what we commonly think to be

substantial becoming.[8] In fact, it is worth noting that the specific disagreements which we find amongst the various particular proponents of *Monism* and *Pluralism* seem to presuppose this more general agreement. For all of these disagreements seem to be over what the precise number and nature of the material principle in substantial becoming actually is, and not over whether or not there is more than one general kind of principle of nature.[9]

However, a closer look at what the proponents of *Monism* and *Pluralism* maintain seems to reveal another, perhaps somewhat unwitting, general agreement. For, as we noted in chapter two, the proponents of *Monism* and *Pluralism* explain the apparent substantial becoming of natural substances in two distinct but similar ways. More specifically, Thales (and, thus, *Monism*) explains this change through the rarefaction and condensation of the one natural substance which exists. On the other hand, Empedocles, Democritus, and Anaxagoras (and, thus, *Pluralism*) explain the apparent substantial becoming of natural substances through the segregation and congregation of the many natural substances which exist (some positing that these many natural substances are finite in number, others positing that these substances are infinite in number). Hence, in explaining the apparent substantial becoming of the natural substances which are most known to us, the proponents of *Monism* and *Pluralism* not only agree that there is something which underlies substantial becoming, but they also agree that there are two other *principia naturae* at work here as well. That is, the proponents of *Monism* and *Pluralism* all agree that there are a total of three principles and

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[8] One sign that this is the case is the fact that the number of principles of nature posited by each particular form of *Monism* and *Pluralism* is exactly equivalent to the number of natural substances which each particular form of *Monism* and *Pluralism* maintains to exist respectively. This is as if to say, "There is nothing in the world beyond the principles which we are here positing."

[9] In other words, it seems that we find the specific disagreements amongst the proponents of *Monism* and *Pluralism* to be taking place against the backdrop of their more general agreement that some material principle is enough to explain the supposed substantial becoming of the natural substances in the world around us.

causes which are responsible for the apparent substantial becoming of the natural substances which are most known to us.

Now if we attend for a moment both to rarefaction and condensation and to segregation and congregation, it is easy to see here two more implicit general agreements amongst the proponents of *Monism* and *Pluralism*. First, since rarefaction and segregation stand to condensation and congregation, respectively, as one first contrary to another, it is clear that all of the proponents of both *Monism* and *Pluralism* agree that two of the three principles and causes of substantial becoming are first contraries. Second, and more specifically, since rarefaction stands to condensation as defect stands to excess or as a little stands to a lot, and since segregation stands to congregation as defect stands to excess or as a little stands to a lot, it is clear that all of the proponents of both *Monism* and *Pluralism* agree that two of the three principles and causes of substantial becoming stand to each other as defect stands to excess or as a little stands to a lot.[10]

Now, putting these insights together, we can readily see that the proponents of both *Monism* and *Pluralism* provide us with a common answer to the above mentioned question. That is, all of these thinkers maintain that there are three general kinds of principles of nature, namely, some material principle and two other principles which stand to each other as first contraries (i.e., according to them, as defect stands to excess or as a little stands to a lot). But it is well known that

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[10] The following text from St. Thomas bears on this: "Dicit ergo primo quod secundum opinionem naturalium philosophorum, duo sunt modi secundum quos generantur res ex principiis. Quorum unum tangebant philosophi naturales ponentes unum tantum principium materiale; sive esset unum de tribus elementis, scilicet igne, aere et aqua (quia terram solam nullus posuit principium, ut supra dictum est), sive aliquod medium inter ea, ut puta quod esset densius igne et subtilius aere. Ab isto autem uno principio dicebant omnia alia generari secundum raritatem et densitatem; ut puta, qui ponebant aerem principium, dicebant quod ex eo rarefacto generatur ignis, ex eo autem condensato generatur aqua. Rarum autem et densum sunt contraria; et reducuntur ad excellentiam et defectum, ut ad quaedam universaliora: nam densum est quod habet multum de materia, rarum autem quod parum." *In Phys.*, Bk. 1, *lectio* 8, vol. 2, p. 24.

a statement is considered to be probable when it is held to by everyone, or by almost everyone, or by the wise (and when held to by the wise, then a statement is considered to be probable when it is held to by all of the wise, or by most of the wise, or by the wisest of the wise).[11] As a result, since the proponents of *Monism* and *Pluralism* are commonly considered to be very wise at least with respect to the study of the natural world (a sign of which is that we still study their works to this day), it follows that their common answer to the above mentioned question must be considered to be probable. Hence, at this point we should think that it is likely that there are in fact three general kinds of principles of nature (i.e., some material principle and two other principles which stand to each other as first contraries).

But granted that everyone admits that some material principle must be involved in substantial becoming, we might wonder whether, beyond the "say-so" of the proponents of *Monism* and *Pluralism*, there is good reason to maintain that there are indeed two other principles of nature which stand to each other as first contraries. Addressing this query, St. Thomas follows Aristotle in pointing out that if there must be more than one principle of nature, then there is good reason to think that the first principles in question must have the nature of first contraries. Regarding this, St. Thomas says:

> Three things seem to belong to the notion of principles: first, that they are not from others; second that they are not from each other; third, that all other things are from them. But these three things belong to first contraries. Thus, first contraries are principles.
>
> But in order to understand what he [i.e., Aristotle] means by "first contraries" it must be considered that there are some contraries which are caused from other contraries, just as the sweet and the sour are caused from the wet and dry and from the hot and cold. But this cannot proceed to infinity. Thus, it is necessary to come to some contraries which are not caused from other contraries, and these he [i..e.,

[11] Aristotle, *Topics*, Bk. I, Ch. 10, 104a8-13.

Aristotle] calls "first contraries."

Therefore, the three aforementioned conditions of principles belong to these first contraries. For, from the fact that they are first, it is manifest that they are not from others; and from the fact that they are contraries, it is manifest that they are not from each other; for although the cold comes to be from the hot insofar as that which before is hot afterwards comes to be cold, nevertheless, coldness itself never comes to be from hotness, as is said later. And third, in what way all things come to be from contraries, it is necessary for us to investigate more diligently.[12]

After noting the three "conditions" which belong to the notion of first principles and after explaining what is meant by the term, "first contraries," St. Thomas makes it manifest that if there are first principles, they would seem to have the nature of first contraries. For, insofar as first contraries are first, it is clear they are not from any principles before themselves. And insofar as they are contraries, it is evident that the first contraries are not from each other. But, as St. Thomas notes, it is not yet manifest that all things come to be from first contraries. That is why he says that this matter needs to be investigated or looked into "more diligently."

Now the more diligent investigation which St. Thomas has in mind here is expressed well in the following text:

Therefore, in order to show this, he [i.e., Aristotle] states that neither action nor passion can happen between just any things, that is, between those things which happen to be together or between random things, that is, between any undetermined things. Nor does anything come to be from anything, as Anaxagoras said, except accidentally.

And this is manifested first in simple things. For white does not come to be

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[12] Tria videntur de ratione principiorum esse: primum quod non sint ex aliis; secundum quod non sint ex alterutris; tertium quod omnia alia sint ex eis. Sed haec tria conveniunt primis contrariis; ergo prima contraria sunt principia. Ad intelligendum autem quid vocet *prima contraria*, considerandum est quod quaedam contraria sunt quae ex aliis contrariis causantur, sicut dulce et amarum causantur ex humido et sicco et calido et frigido: sic autem non est procedere in infinitum, sed est devenire ad aliqua contraria quae non causantur ex aliis contrariis, et haec vocat *prima contraria*. His igitur primis contrariis tres praedictae conditiones conveniunt principiorum. Ex eo enim quod *prima* sunt, manifestum est quod non sunt ex aliis; ex eo vero quod *contraria* sunt, manifestum est quod non sunt ex alterutris: quamvis enim frigidum fiat ex calido inquantum id quod prius est calidum postea fit frigidum, tamen ipsa frigiditas nunquam fit ex caliditate, ut postea dicetur. Tertium vero, qualiter omnia fiant ex contrariis, oportet diligentius investigare. *In Phys.*, Bk. 1, *lectio* 10, vol. 2, pp. 33-34.

from musical except accidentally, insofar as the musical happens to be white or black; but white comes to be *per se* from non-white and not from any non-white, but from the non-white that is black or some intermediate color.... And in the same way something is not corrupted first and *per se* into just anything; just as white is not corrupted into the musical except accidentally. But it is corrupted into non-white, and not into any non-white, but into black or some color in between.... And the reason for this is because everything which comes to be and is corrupted is not before it comes to be nor is after it is corrupted. Whence it is necessary that that from which something comes to be *per se* and that into which something is corrupted *per se* be such that in its notion it include the non-being of that which comes to be or ceases to be.

And similarly he [i.e., Aristotle] manifests this in composite things....

Thus, as if through induction it is manifest that all things which come to be or are corrupted, come to be from contraries or from things between contraries or are corrupted into these. But these things between contraries come to be from contraries, just as middle colors [come to be] from white and black. Hence, he [i.e., Aristotle] concludes that all things which come to be according to nature either themselves are contraries, as white and black, or come to be from contraries, as do the things between the contraries.

And this is the principal aim which he [i.e., Aristotle] intended to conclude, namely, that all things come to be from contraries which was the third condition of the principles.[13]

Here St. Thomas, following Aristotle, shows us that if we attend to the nature of coming to be and of ceasing to be, we see that it is false to think that, speaking *per se*, anything comes to be from anything or that anything ceases to be into anything. Rather, St. Thomas's points out that, speaking

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[13] Ad hoc igitur ostendendum, praemittit primo quod neque actio neque passio potest accidere inter *contingentia*, idest inter ea quae contingunt simul esse: vel inter *contingentia*, idest inter quaecumque indeterminata. Neque quodlibet fit ex quolibet, sicut Anaxagoras dixit, nisi forte secundum accidens. Et hoc manifestatur primo in simplicibus. Album enim non fit ex musico nisi forte secundum accidens, inquantum musico accidit esse album vel nigrum; sed album fit per se ex non albo, et non ex quocumque non albo, sed ex non albo quod est nigrum vel medius color...Et eadem ratione non corrumpitur aliquid primo et per se in quodcumque contingens: sicut album non corrumpitur in musicum nisi per accidens, sed corrumpitur per se in non album; et non in quodcumque non album, sed in nigrum aut in medium colorem.... Et huius ratio est, quia omne quod fit et corrumpitur, non est antequam fiat, nec est postquam corrumpitur: unde oportet quod id quod per se aliquid fit, et in quod per se aliquid corrumpitur, tale sit quod in sua ratione includat non esse eius quod fit vel corrumpitur. Et similiter manifestat hoc in compositis.... Sic igitur quasi per inductionem manifestum est quod omnia quae fiunt vel corrumpuntur, fiunt ex contrariis vel mediis, vel corrumpuntur in ea. Media autem fiunt ex contrariis, sicut colores medii ex albo et nigro: unde concludit quod omnia quae fiunt secundum naturam, vel ipsa sunt contraria, sicut album et nigrum, vel fiunt ex contrariis, sicut media. Et hoc est principale intentum quod intendit concludere, scilicet quod omnia fiunt ex contrariis, quod erat tertia conditio principiorum. *In Phys.*, Bk. I, *lectio* 10, vol. 2, p. 34.

*per se*, whatever comes to be always comes to be from its contrary and whatever ceases to be always ceases to be into its contrary. Yet why is this so? St. Thomas begins to give us the reason for this when he observes that "everything which comes to be and is corrupted is not before it comes to be nor is after it is corrupted." As a result, it must be that "that from which something comes to be *per se* and that into which something is corrupted *per se* be such that in its notion it include the non-being of that which comes to be or ceases to be." Thus, we see that whatever comes to be always comes to be from its contrary and whatever ceases to be always ceases to be into its contrary precisely because of the natures of coming to be and ceasing to be.

From this it appears that if we are to designate principles whereby we can explain the substantial becoming of the natural substances most known to us, two of these principles must be contrary to one another. And since, as we saw above, some contraries are prior to other contraries, it stands to reason that if we are to designate *first* principles whereby we can explain the substantial becoming of these same substances, two of these principles must have the nature of *first* contraries.

Now given this, we might ask the following question: Are two principles which have the nature of first contraries enough to account for the substantial becoming of the natural substances which are most known to us? In response to this, St. Thomas, following Aristotle, has the following to say:

> ...if there were only two contrary principles, it is not clear how all things could come to be from these two principles. For it cannot be said that one of the contraries makes something from the remaining contrary. For density is not able to change rarity itself into something, nor is rarity able to do this to density. And similarly with any other contrariety. For love does not move strife and make something out of it, nor does the converse happen. But each of the contraries changes some third thing, which is the subject of both. For hot does not make coldness itself to be hot, but rather the subject of coldness; nor conversely [does cold make hotness itself to be cold, but rather the subject of hotness]. Therefore, it seems that it is necessary to posit some third thing

> which is the subject of the contraries in order that from the contraries other things might come to be.[14]

From this line of argument, it is clear that if we are to explain substantial becoming, not only must we posit two principles which have the nature of first contraries, but we must also posit some material principle which underlies these contraries. And with these three general kinds of principles before us, it would seem as though we have enough of the right kinds of principles to explain the substantial becoming of the natural substances which are most known to us. Hence, at this point we can say, once more, that it seems probable that there are in fact three general kinds of principles of nature which are responsible for the substantial becoming of the natural substances which are most known to us (i.e., some material principle and two other principles which stand to each other as first contraries).

## 4. Résumé

Having come to this point, let us now bring together what we have established in this chapter. First, and quite importantly, we have observed that in at least two significant ways both *Monism* and *Pluralism* violate the *modus procedendi* which must be followed, if we are to arrive at the true answer to the question, *Quid sint principia naturae*? Second, and as a result of the first point, we have seen that both *Monism* and *Pluralism* must be false accounts of the *principia naturae* at least

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[14] ...si autem sint tantum duo contraria principia, non videtur quomodo ex illis duobus possint omnia fieri. Non enim potest dici quod unum eorum facit aliquid ex reliquo: non enim densitas nata est convertere ipsam raritatem in aliquid, neque raritas densitatem. Et similiter est de qualibet alia contrarietate: non enim concordia movet discordiam et facit aliquid ex ipsa, neque e converso. Sed utrumque contrariorum transmutat aliquod tertium, quod est subiectum utriusque. Calidum enim non facit esse calidam ipsam frigiditatem, sed subiectum frigiditatis: nec e converso. Videtur ergo quod oporteat poni aliquod tertium, quod sit subiectum contrariorum, ad hoc quod ex contrariis alia possint fieri. *In Phys.*, Bk. 1, *lectio* 11, vol. 2, p. 38.

to the extent that they maintain that the material principle in substantial becoming is some substance(s). Third, and as a consequence of the second point, we have seen that both the dilemma which *Monism* and *Pluralism* jointly set forth and the argument which they provide as a basis for this dilemma are in fact flawed and, thus, are answerable in principle. Fourth, we have seen that despite the fact that both *Monism* and *Pluralism* are in part false, they are also probably in part true, and this to the extent that their proponents commonly posit that the *principia naturae* consist in some material principle and two other principles which stand to each other as first contraries. Fifth, and finally, from a brief investigation into what seems to be required in order for coming to be and ceasing to be to occur at all, we have seen some additional evidence that the *principia naturae* probably consist in some material principle and two other principles which stand to each other as first contraries.

Now putting together the second of these points with the fourth and fifth points, we can maintain that the most probable thing to say, at present, regarding the *principia naturae* seems to be this: (1) there are three principles of nature (i.e., some material principle and two other principles which stand to each other as first contraries) and (2) the material principle in substantial becoming cannot be some substance(s). Yet in this chapter we have been proceeding largely *per modum disputationis*.[15] It remains, then, for us to see whether or not we can arrive at this same conclusion,

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[15] Perhaps we can also state that our way of proceeding in this chapter has largely been "rationabilis" according to the second meaning of this name. Regarding this meaning, St. Thomas writes: Alio modo dicitur processus rationalis ex termino in quo sistitur procedendo. Ultimus enim terminus, ad quem rationis inquisitio perducere debet, est intellectus principiorum, in quae resolvendo iudicamus; quod quidem quando fit non dicitur processus vel probatio rationabilis, sed demonstrativa. Quandoque autem inquisitio rationis non potest usque ad praedictum terminum perduci, sed sistitur in ipsa inquisitione, quando scilicet inquirenti adhuc manet via ad utrumlibet; et hoc contingit, quando per probabiles rationes proceditur, quae natae sunt facere opinionem vel fidem, non scientiam. Et sic rationabilis processus dividitur contra demonstrativum. Et hoc modo rationabiliter procedi potest in qualibet scientia, ut ex probabilibus paretur via ad necessarias probationes. Et hic est alius modus, quo logica utimur in scientiis demonstrativis, non quidem ut est docens, sed ut est utens." *In de Trin.*, q. 6, a. 1.

or one close to it, *per modum demonstrationis*.[16]

[16] Here we borrow the terms that St. Thomas uses in order to name the different ways in which Aristotle proceeds in chapters 5-7 of Book One of the *Physics*. See *In Phys.*, Bk., I, *lectio* 10, vol. 2, p. 33.

## Chapter Six: The Definitive Answer to the Question

Bearing in mind what was established in the last chapter *per modum disputationis*, we shall here attempt to proceed *per modum demonstrationis* to the true answer to the question, *Quid sint principia naturae*? Now in order to do this in keeping with what was established in chapter three, this chapter is divided into two main parts. In the first part, we shall endeavor to arrive at a most general understanding of the principles of nature. Thereafter, in the second part of this chapter, we shall attempt to know these very same principles more determinately.

In the next chapter we shall attempt to show how our more determinate knowledge of the principles of nature, gleaned in this chapter, enables us both to account for what we know thanks to our common experience and to resolve the difficulties raised by *Monism* and *Pluralism*. While in this chapter we shall be following what we called above the *via resolutionis*, in the next chapter we shall be following the *via compositionis*.

### Part I

In chapter five we observed that one way in which the proponents of *Monism* and *Pluralism* went astray was through failing to answer the more general question, "How many general kinds of principles of nature are there?," before attempting to answer the more specific question, "What is the precise nature of the principle and cause which underlies the changes which we take to be substantial becomings?" Now to ask, "How many general kinds of principles of nature are there?," is essentially to ask, "What are the principles of substantial becoming?" Hence, rewording the difficulty, we can say that one way in which the proponents of *Monism* and *Pluralism* failed to follow the proper *modus procedendi* laid down in chapter three was through their attempt to answer

the question, "What is the precise nature of *this* principle and cause of substantial becoming?," before they had answered the more general question, "What are the principles of substantial becoming?" It must be noted, however, that since the order in our understanding is from the general and confused to the specific and distinct, we are required not only to understand what the principles of substantial becoming are before we understand the precise nature of *this* principle of substantial becoming, but also to understand what the principles of becoming in general are before we understand what the principles of *substantial* becoming are. Hence, rather than beginning with the question, "What are the principles of substantial becoming?," let us begin here with the more general question: "What are the principles of becoming?"

Now, in order to answer this question, we shall attempt to separate out those things which are found in every becoming (i.e., both accidental and substantial becoming).[1] Further, since accidental becoming is more known to us than substantial becoming, we should attempt to separate out those things which are found in every accidental becoming before we attempt to locate those things that are found in every substantial becoming. However, before we look at accidental becoming itself, let us first attend to our common speech about accidental becoming in order to gain some insight into our common understanding of the reality which we call "accidental becoming."

## 1. Our Speech about Accidental Becoming

In this vein, let us follow Aristotle and St. Thomas's lead and reflect on several different

[1] The way in which we are proposing to come to understand both the principles of becoming in general and the principles of substantial becoming in particular is similar to the way in which Aristotle arrives at a definition of soul in general and, thereafter, at definitions of the various kinds of soul in Books Two and Three of *On the Soul.*

ways in which we signify our understanding of some particular accidental becoming, such as that whereby a man becomes musical. We signify our understanding of this change in the following three ways:

(1) The man becomes musical
(2) The unmusical becomes musical
(3) The unmusical man becomes a musical man

The first and, perhaps, most obvious thing to be noted about these three statements is that the names signifying that to which the becoming is attributed (*id cui attribuitur fieri*) and that at which the becoming is terminated (*id ad quod terminatur fieri*) in the first two statements are simple names, while the names signifying both of these things in the third statement are composite names. Together with this, it is manifest that the composite names of the third statement are names which are made up out of the simple names found in the first two statements.[2]

Attending now to the first two statements, it is not difficult to see that there is an essential difference between the way in which "becomes musical" is attributed to "man," on the one hand, and to "unmusical," on the other. We can approach this difference in two steps. The first step involves noting that when we have a statement in the form of, "this becomes that," we can rephrase the statement in the form of, "from this, that comes to be." But it is clear that the first two statements mentioned above are in the form of, "this becomes that." Hence, we can rephrase them as follows: "From the man, the musical comes to be" and "From the unmusical, the musical comes to be." Now, while the second of these statements sounds true, the first should strike us as false. For the

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[2] The other two possible ways of signifying our understanding of this change are "The unmusical man becomes musical" and "The unmusical becomes a musical man." In the first case, *id cui attribuitur fieri* is signified by a composite name while *id ad quod terminatur fieri* is signified by a simple name. In the second case, *id cui attribuitur fieri* is signified by a composite name while *id ad quod terminatur fieri* is signified by a simple name. As will become clear below, these two additional ways of signifying our understanding of the said change are not as relevant as the aforementioned ones. See *In Phys.* Bk. 1, *lectio* 12, vol. 2, p. 41.

preposition, "from," as used here, signifies the leaving behind of its grammatical object. In other words, the meaning of first statement is something like this, "When the musical comes to be, the man is left behind." Similarly, the meaning of the second statement is, "When the musical comes to be, the unmusical is left behind." This explains, then, why we find the rephrasing of the first statement to be false. For when we say, "the man becomes musical," everyone understands that "the man" is still there after the change (i.e., he has not been left behind). On the other hand, when we say, "the unmusical becomes musical," we all understand that "the unmusical" is no longer present after the change (i.e., it has been left behind).

The second step makes this same point, albeit more simply and clearly. This step involves noting that we can predicate both "becomes musical" and "is musical" of "the man," whereas we cannot predicate both of "the unmusical." That is, we can say, "The man becomes musical," and, after this, we can affirm, "The man is musical." However, while we can state, "The unmusical becomes musical," we cannot affirm, without contradiction, that "The unmusical is musical." From this we again see that our common speech reveals that we all understand that "becomes musical" is attributed to "the man" and to "the unmusical" differently.

To name this difference more formally, we can say that "becomes musical" is attributed to "the man" *per se*, while it is attributed to "the unmusical" only *per accidens*. In other words, "becomes musical" is attributed to "the man" precisely as such and to "the unmusical" only insofar as being unmusical is something which happens to "the man." Hence, we can say that our common speech, if examined closely, reveals a certain common understanding that we have of the difference between that to which "becomes musical" is attributed *per se* and that to which it is attributed *per*

*accidens*.[3]

With this distinction in mind, let us now attend to the third statement presented above. It was noted before that, in this statement, the names which signify that to which the becoming is attributed and that at which the becoming is terminated are in some way composed. But we are now able to say, more specifically, that the composite name, in the third statement, which signifies that to which the becoming is attributed is put together from the name which signifies that to which the becoming is attributed *per se* as well as from the name which signifies that to which the becoming is attributed *per accidens*. In turn, the composite name, in the third statement, which signifies that at which the becoming is terminated is a name composed of the name which signifies that to which the becoming is attributed *per se* and of the simple name (from the first two statements) which signifies that at which the becoming is terminated. Hence, this third statement seems to indicate that we commonly understand both that to which the becoming is attributed *per se* and that to which the becoming is attributed *per accidens* to be present at the beginning of the becoming in question, while we understand that to which the becoming is attributed *per se* and that at which the becoming is terminated (as signified by a simple name) to be present at the end of the same becoming.

Therefore, from our brief analysis of these three ways of signifying our understanding of the change whereby a man becomes musical, two important points have become clear. The first is simply that we find in our common understanding of this change three things, to wit, (1) that to which the becoming is attributed *per se*, (2) that to which it is attributed *per accidens*, and (3) that at which the becoming terminates.

Second, it is also clear that we understand (1) that to which the becoming is attributed *per*

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[3] *In Phys.* Bk. 1, *lectio* 12, vol. 2, pp. 41-42.

*se* to have the nature of *matter* or a *material principle*, (2) that at which the becoming is terminated to have the nature of a *form*, and (3) that to which the becoming is attributed *per accidens* to have the nature of an *opposite* of the form. That we understand that to which the becoming is attributed *per se* to have the nature of *matter* or a *material principle* seems clear from the fact that the name which signifies it is a composing part of both the subject and predicate in the third statement presented above. In other words, since "the man" is part of both "the unmusical man" and "the musical man," it seems manifest that we understand "the man" to underlie the change from beginning to end. Further, we understand that at which the becoming is terminated to have the nature of a *form* insofar as we understand it to be not only that at which the becoming stops or ceases, but also to be that which forms or determines the matter after it has ceased becoming. Put more concretely, the name "musical" forms or determines the name "the man." Or, to speak more grammatically, we can say that "musical" modifies "the man." Lastly, since that to which the becoming is attributed *per accidens* is named so as to signify a lack of the form just mentioned, it is clear that we understand it to have the nature of an *opposite* of the form.[4]

Hence, putting these two points together, we can say that the above analysis has made clear that we understand there to be three things involved in the change whereby a man becomes musical, to wit, matter, a form, and an opposite of the form. But it is easy to see that the points we have made here apply not only to our common speech about the change in which a man becomes musical, but also to our common speech about any other case of accidental becoming. Therefore, speaking generally, we can say that our common speech about accidental becoming reveals that we all

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[4] We are not presently concerned with the kind of opposite that we have in mind here. This will be discussed below.

understand there to be three things involved in any accidental becoming, to wit, a material principle, a form, and an opposite of the form.[5]

## 2. Things Common to Every Accidental Becoming

Now let us turn from our consideration of our common speech about accidental becoming to a consideration of the reality which we call "accidental becoming." In so doing, let us ask this question: Do we find in every accidental becoming three things which correspond to what we have named "matter," "form," and "opposite of the form" in our speech about accidental becoming? In other words, do we find in every accidental becoming things which we can name "matter," "form," and "opposite of the form"?

Turning, then, to a look at the reality which we call "accidental becoming," it is not difficult to see that the question just raised must be answered in the affirmative. For, it is evident that in every accidental becoming a substance which is not such becomes such. For example, let us think of Mr. Smith who starts off unmusical and becomes musical. Thus, it is clear that in every accidental becoming there is a substance which underlies the becoming from beginning to end. In the example just proposed the substance is clearly Mr. Smith. Now it is also plain that the substance which underlies the accidental becoming differs at the end of the becoming and at the beginning of

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[5] It seems that this way of approaching the *principia naturae* could be termed "rationabilis" according to this first meaning of this name distinguished by St. Thomas in *In de Trin.*, q. 6, a. 1, vol. 50, p. 159. There he states: "processus aliquis, quo proceditur in scientiis, dicitur rationabilis tripliciter. Uno modo ex parte principiorum, ex quibus proceditur, ut cum aliquis procedit ad aliquid probandum ex operibus rationis, cuiusmodi sunt genus et species et oppositum et huiusmodi intentiones, quas logici considerant. Et sic dicetur aliquis processus esse rationabilis, quando aliquis utitur in aliqua scientia propositionibus, quae traduntur in logica, prout scilicet utimur logica, prout est docens, in aliis scientiis. Sed hic modus procedendi non potest proprie competere alicui particulari scientiae, in quibus peccatum accidit, nisi ex propriis procedatur. Contingit autem hoc proprie et convenienter fieri in logica et metaphysica, eo quod utraque scientia communis est et circa idem subiectum quodammodo.."

the becoming. For, at the end of the becoming, the substance in question is such, whereas at the beginning of the becoming, it is not such. Thus, Mr. Smith is musical at the end of his becoming musical, while at the beginning of the change he is unmusical. Now this difference demands an explanation. Hence, there must be some principle and cause in the substance at the end of the becoming, in virtue of which it is such, which is not in it at the beginning of the becoming. In our example, then, we find that the art of music is in Mr. Smith at the end of his becoming musical (and it is that by which he is musical), whereas this same art is absent from him at the beginning of the becoming. Thus, we can see that in every accidental becoming a substance acquires a certain principle or cause which it previously lacked.

Now it is evident that the substance which undergoes the accidental becoming corresponds to what in our speech about accidental becoming we have called "matter." For this substance underlies the accidental becoming from beginning to end. Likewise, the principle or cause in the substance at the end of the becoming, in virtue of which the substance is such, corresponds to what we have called "form." For just as the name "musical" forms or determines the name "man," so too does the principle or cause in question form or determine the substance which underlies it. Lastly, the lack of the form in the substance at the beginning of the becoming corresponds to the name "opposite of the form," insofar as this lack is the opposite of what in accidental becoming corresponds to the name "form."

Accordingly, it is clear that we have found what we set out to find. That is, we have determined that in every accidental becoming there are three things which indeed correspond to what we have named, "matter," "form," and "opposite of the form."

3. *Excursus*: What Kind of Opposite is the "Opposite of the Form"?

At this point it is important to note a certain movement that has taken place both in our speech and in our thought. We have advanced from thinking and speaking about a form and its opposite to thinking and speaking about a form and its privation. That is, we have advanced from knowing and naming a certain opposition more generally to knowing and naming it more specifically. Yet, we should wonder about what it is that warrants us to do this. For given that there are four kinds of opposition, namely, contradiction, possession and privation, contrariety, and correlativity,[6] how can we be sure that the kind of opposition found between a form and its opposite is the kind of opposition found between what is possessed and the privation thereof as opposed to one of the other kinds of opposition?

In order to answer this query, we shall have to show in some way that the other kinds of opposition are not what we have in mind when we speak of the way in which a form and its opposite stand to each other. To begin, it is easy to see that the kind of opposition between a form and its opposite is not that of correlativity. For the opposition of correlativity is such that the opposites in question are together both in being and in our understanding. For example, the correlative opposites "double" and "half" must both be if either is to be and must both be understood if either is to be understood. But a form and its opposite are not together in this way either in being or in our understanding. For when Mr. Smith has come to be musical, he is no longer unmusical. Further,

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[6] The four kinds of opposition are set forth by Aristotle in chapter ten of the *Categories*. St. Thomas shows that these kinds of opposition are exhaustive in the following text: "[Aristoteles] dicit quot modis dicuntur opposita; quia quatuor modis; scilicet contradictoria, contraria, privatio et habitus, et ad aliquid. Aliquid enim contraponitur alteri vel opponitur aut ratione dependentiae, qua dependet ab ipso, et sic sunt opposita relative. Aut ratione remotionis, quia scilicet unum removet alterum. Quod quidem contingit tripliciter. Aut enim totaliter removet nihil relinquens, et sic est negatio. Aut relinquit subiectum solum, et sic est privatio. Aut relinquit subiectum et genus, et sic est contrarium. Nam contraria non sunt solum in eodem subiecto, sed etiam in eodum genere." *In Metaphys.*, Bk. 5, *lectio* 12, p. 295 (#922).

we must understand musical in some way *before* we understand unmusical. Hence, it is manifest that the opposition between a form and its opposite cannot be that of correlativity.

Yet, neither can the opposition between a form and its opposite be that of contradiction. St. Thomas gives the reason for this in the second chapter of *DPN*. There he writes:

> And it must be known that although generation is from non-existence, we do not say that negation is a principle, but rather privation. For negation does not determine a subject to itself. For "does not see" can be said even of non-beings, as in, "the chimera does not see," and also of beings which do not have sight by nature, as when it is said of stones. But privation is not said except of a determinate subject in which it is natural for a certain perfection [*habitus*] to come to be, as blindness is not said except of those things which see by nature.
>
> And since generation is not from non-being simply, but from non-being which is in some subject, and not in any subject, but only in a determinate one – for fire does not come to be from any non-fire, but only from such non-fire as is apt to come to be by the form of fire – therefore, it is said that privation is a principle.[7]

With these clarifications in mind, we can put together the following argument: The opposition of contradiction (i.e., the opposition between affirmation and negation) does not require a determinate material principle. But the opposition between a form and its opposite does require a determinate material principle. For example, the opposition between music and the lack of music cannot be apart from man who is the determinate material principle (i.e., the material principle that is naturally such that it is able to be musical). Thus, the opposition between a form and its opposite is not the opposition of contradiction (i.e., the opposition between affirmation and negation).

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[7] Et sciendum, quod cum generatio sit ex non esse, non dicimus quod negatio sit principium, sed privatio, quia negatio non determinat sibi subiectum. Non videt enim potest dici etiam de non entibus, ut Chimaera non videt; et iterum de entibus quae non nata sunt habere visum, sicut de lapidibus. Sed privatio non dicitur nisi de determinato subiecto, in quo scilicet natus est fieri habitus; sicut caecitas non dicitur nisi de his quae sunt nata videre. Et quia generatio non fit ex non ente simpliciter, sed ex non ente quod est in aliquo subiecto, et non in quolibet, sed in determinato (non enim ex quolibet non igne fit ignis, sed ex tali non igne, circa quod nata sit fieri forma ignis), ideo dicitur quod privatio est principium. *DPN*, ch. 2, vol. 43, p. 40.

Thus, it remains for us to show that the opposition between a form and its opposite is not that of contrariety. At first glance, this task seems a bit more difficult. For it is clear from our common experience that many accidental becomings are changes from one contrary to another. For example, when Mr. Smith changes from being pale to being tan, he changes from one contrary to another. Or, when he changes from being healthy to being sick, Mr. Smith changes from one contrary to another. Or, again, when Mr. Smith changes from being vicious to being virtuous, he changes from one contrary to another. Hence, one might be inclined to think that every accidental becoming is a change from one contrary to another. Yet this is not so. Indeed, part of the brilliance of Aristotle's example of accidental becoming which we examined above (i.e., that of the man becoming musical) is that it makes this truth quite manifest.[8] For it is clear that a man need not possess some habit which is opposed to the art of music in order to become musical. He only need lack the art of music. Moreover, this is true about the acquisition of any virtue.[9] For example, when a child attains the use

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[8] The following text from St. Thomas is quite pertinent here: "...quaedam opposita sunt quorum utrumque ponit naturam aliquam, ut album et nigrum; et in talibus oppositis negatio utriusque est negatio realis, id est alicuius rei. Et ideo, cum affirmatio non sit negatio, quia esse album non est idem quod non esse nigrum, sed realiter differunt, ideo corruptio nigri cuius terminus est non esse nigrum, et generatio albi cuius terminus est esse album, sunt realiter diversae mutationes, quamvis sit unus motus, ut supra, art. 1 huius quaest., dictum est. Quaedam vero opposita sunt quorum alterum tantum est natura quaedam, reliquum vero non est nisi remotio vel negatio ipsius, sicut patet in oppositis secundum affirmationem et negationem vel secundum privationem et habitum; et in talibus negatio oppositi, quod ponit naturam aliquam, est realis, quia est alicuius rei; negatio vero alterius oppositi non est realis, quia non est alicuius rei. Est enim negatio negationis, quae est negatio alterius oppositi: et ideo haec negatio negationis nihil differt secundum rem a positione alterius; unde secundum rem idem est generatio albi et corruptio non albi. Sed quia negatio, quamvis non sit res naturae, est tamen res rationis, ideo negatio negationis secundum rationem, sive secundum modum intelligendi, est aliud a positione affirmationis: et sic corruptio non albi secundum modum intelligendi est aliud quam generatio albi." *De veritate*, q. 28, a. 6, vol. 22, p. 837. From this we can say that the coming to be of the musical man and the ceasing to be of the unmusical man are *idem secundum rem* and differ only *secundum modum intelligendi*. Hence, through the example of accidental becoming that Aristotle has given us, he has separated coming to be as much as possible from ceasing to be.

[9] St. Thomas makes this point explicitly regarding the acquisition of intellectual virtue. He writes: "...dicendum, quod cum aliquis ab errore reducitur ad scientiam veritatis, est ibi quaedam similitudo alterationis, quae est de contrario ad contrarium; non tamen vere est ibi talis alteratio. Nam alterationi, quae est de contrario in contrarium, utrumque per se et essentialiter competit: scilicet quod sit a contrario, et quod sit in contrarium. Sicut enim dealbatio non est nisi ad album, ita non est nisi a nigro vel medio, quod respectu albi, est quodammodo nigrum.

of reason and thereafter acquires the virtues of prudence, justice, fortitude, and temperance, his becoming virtuous begins from a mere privation of these virtues as opposed to the possession of the vices contrary to them. Thus, while a vicious man who becomes virtuous moves from one contrary to another, the child who becomes virtuous right after attaining the use of reason only moves from lacking the virtues to having them. Hence, it should be clear that the opposition of contrariety is not the kind of opposition that exists between a form and its opposite. For the latter is found in every accidental becoming, while the former is not.[10]

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Sed in acquisitione scientiae accidit quod ille qui acquirit scientiam veritatis, prius fuerit in errore: absque hoc enim potest adduci ad scientiam veritatis; unde non est vere alteratio de contrario in contrarium."
*In de Anima*, Bk. 2, *capitulum* 11, vol. 45, 1, p. 112. See also the related text, *ST* I, q. 75, a. 5 *ad* 2*um*, vol. 5, p. 202.

[10] Regarding this point, Fr. Joseph Owens maintains the following: "In the first book of the *Physics*, the Stagirite surveyed the teachings of his philosophic predecessors on the basic principles of natural things. Things in the world of nature were known by observation to be capable of motion and change. In the course of his survey, attention is focused upon the universal requirements for change. Any change whatsoever needs three principles. It has to have a subject that loses one form and acquires another. The three principles necessarily involved are therefore the form that is lost, the form that is acquired, and the subject that undergoes the loss of the old form and the acquisition of the new.

"The Aristotelian examples meant to illustrate this doctrine are clear enough. They are concrete individual materials that lose and acquire different forms. Bronze is the subject that becomes a statue. At first the bronze has a nondescript form or shape. Then it is cast into the form of a statue, say the Greek god Hermes. It is the subject that changes from one form or shape to another. The notion of form in this example is readily understood from its ordinary English use. It is the external shape of the bronze. Another Aristotelian example, however, uses 'form' in a more esoteric way. A man from an uneducated state comes to be educated. The man is the subject that changes from uneducated to educated. 'Uneducated' describes the quality of the man who has not had proper schooling. 'Educated' means the quality of adequate instruction and cultural training. Both 'educated' and 'uneducated' mean qualities; and in the Aristotelian vocabulary qualities are forms.

"As can be seen in these examples, the original form from which the subject changes is more properly regarded from the viewpoint of a privation of the form to be acquired in the change. It is expressed in a privative way, as in the term '*un*educated'.... Change can take place in any of the categories of being. But in its very notion, as has emerged from the foregoing analysis, it involves indispensibly the three principles – a subject that changes, a form that is lost, a form that is acquired." See his, "Matter and Predication in Aristotle," pp. 42-43.

While Fr. Owens's understanding of Aristotle's argument has much to recommend it, he does not distinguish between the principles of change and the principles of motion. In other words, Fr. Owens takes Aristotle to be saying that the principles of motion (i.e., two contrary forms and a subject or material principle) are the principles of every change. St. Thomas, however, interprets the first book of the *Physics* otherwise. He points out that while every *motus* is a *mutatio*, not every *mutatio* is a *motus*. Hence, while two contrary forms and a subject or material principle are present in every *motus*, they are not present in every *mutatio*. Regarding this, St. Thomas states: "Et dicit manifestum esse ex dictis quot sunt principia circa generationem naturalium, et quomodo sint tot. Ostensum est enim quod oportet duo esse contraria, quorum unum est principium per se et alterum per accidens; et

From the foregoing, therefore, we can conclude that the kind of opposition found between a form and its opposite is indeed what is found between what is possessed and the privation thereof as opposed to one of the other kinds of opposition. As a result of this, it is manifest that the things which we have named "matter," "form," and "opposite of the form," and which we can here rename "matter," "form," and "privation," are indeed found in every accidental becoming. Yet since our aim here is to discover those things that are found in every becoming, it remains for us to determine whether these same three things are found in every substantial becoming as well. If indeed they are, then it will be evident that these three things are found in every becoming (for there is no other kind of becoming besides accidental becoming and substantial becoming since there are only two sorts of existence, namely accidental existence and substantial existence).

## 4. Things Common to Every Substantial Becoming

Now in order to make clear that things which we can name "matter," "form," and "privation" are found in every substantial becoming, we can reflect on substantial becoming in a way similar to the way in which we reflected on accidental becoming above. More specifically, we should begin

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quod aliquid subiiciatur contrariis, quod est etiam principium per se. Sed aliquo modo alterum contrariorum non est necessarium ad generationem: sufficit enim alterum contrariorum quandoque facere mutationem absentia sua et praesentia. Ad cuius evidentiam sciendum est quod, sicut in quinto huius dicetur, tres sunt species mutationis, scilicet generatio et corruptio et motus. Quorum haec est differentia, quia motus est de uno affirmato in aliud affirmatum, sicut de albo in nigrum; generatio autem est de negato in affirmatum, sicut de non albo in album, vel de non homine in hominem; corruptio autem est de affirmato in negatum, sicut de albo in non album, vel de homine in non hominem. Sic igitur patet quod in motu requiruntur duo contraria et unum subiectum. Sed in generatione et corruptione requiritur praesentia unius contrarii et absentia eius, quae est privatio. Generatio autem et corruptio salvantur in motu: nam quod movetur de albo in nigrum, corrumpitur album et fit nigrum. Sic igitur in omni mutatione naturali requiritur subiectum et forma et privatio. Non autem ratio motus salvatur in omni generatione et corruptione, sicut patet in generatione et corruptione substantiarum. Unde subiectum et forma et privatio salvantur in omni mutatione; non autem subiectum et duo contraria." *In Phys.*, Bk. 1, *lectio* 13, vo. 2, p. 46. Now since we are here attempting to discover those things that are common to *every* accidental becoming, we are considering accidenal becoming insofar as it is a *mutatio*.

by noting that in every substantial becoming some matter which is not a certain substance becomes that substance.[11] For example, when Mr. Smith comes to be from certain human reproductive materials, some matter which is not Mr. Smith becomes Mr. Smith. Thus, it is clear that in every substantial becoming there is some matter which underlies the becoming from beginning to end. In the example just mentioned, the matter is what becomes Mr. Smith. Now it is also evident that the matter which underlies substantial becoming differs at the end of the becoming and at the beginning of the becoming. For, at the end of the becoming, the matter in question is part of a certain substance, while at the beginning of the becoming, the same matter is not part of that substance. Thus, the matter which becomes Mr. Smith is part of Mr. Smith at the end of the becoming, whereas at the beginning of the becoming it is not part of him. Now this difference demands an explanation. Hence, there must be some principle and cause in the matter at the end of the becoming, in virtue of which the matter is part of the substance in question, which is not in it at the beginning of the becoming. In our example, then, we must hold that some principle and cause is in the matter at the end of the becoming (which is that by which the matter in question is made to be part of the substance whom we name "Mr. Smith"), whereas this same principle and cause is absent from the matter at the beginning of the becoming. Thus, we can see that in every substantial becoming some matter acquires a certain principle or cause which it previously lacked.

But above we gave the name "matter" to the substance which undergoes accidental becoming, the name "form" to the principle and cause through which the same substance is such at

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[11] Here, of course, we should have in mind the examples of substantial becoming which we have chiefly employed heretofore. When these human reproductive materials become Mr. Smith, some matter becomes Mr. Smith. Likewise, when Mr. Smith dies, some matter becomes this corpse. Lastly, when this food becomes Mr. Smith, some matter becomes the flesh and bones of the already extant Mr. Smith.

the end of the becoming, and the name "privation" to the non-being of the form in the substance at the beginning of the accidental becoming. Hence, it seems that we can extend these same names in order to name three things which we see in substantial becoming. Thus, in substantial becoming "matter" names that something which undergoes the substantial becoming or which underlies the substantial becoming from beginning to end. Likewise, "form" names that principle and cause in virtue of which the matter is part of a certain substance at the end of the becoming. Lastly, "privation" names the non-being of the form in the matter at the beginning of the substantial becoming.

## 5. *Excursus*: How Do We Come to See that There is Matter which Underlies Substantial Becoming?

It seems, then, that what we have here named "matter," "form," and "privation" are found both in every accidental becoming and in every substantial becoming. Yet, before we maintain this definitively, perhaps it would be worthwhile to raise an important consideration regarding the matter or material principle in substantial becoming. Up to this point in this essay we have been assuming, together with all of the proponents of both *Monism* and *Pluralism*, that everyone who has experience with nature sees that there is indeed some matter which underlies every change wherein this substance of this kind becomes that substance of that kind. Yet, at the same time, it is evident that this matter is not some sensible substance as is the matter in accidental becoming.[12] That is,

[12] Fr. Owens elucidates this point well. He states: "When one substance changes into another, what disappears is the most basic principle of determination and knowability, the principle that most radically made food one thing and man another thing. Without it, nothing in the thing could be knowable or observable. It is of course immediately succeeded by the form of the new thing. But the change of the one thing into the other requires a common subject, according to the very notion of change. Such a common subject will be unobservable both in principle and in fact, because it is what loses and acquires the most basic of forms and so of itself has not even the

whatever the matter in substantial becoming is, it cannot be some substance which is the subject of various accidents which are sensible *per se* (as is the case with the matter in accidental becoming). Hence, while it is true that we all see that there is matter or a material principle in substantial becoming, we can still ask this question: How do we *come to see* that there is such matter or such a material principle in the first place?

The Philosopher does not leave this question unanswered. Rather, in the seventh chapter of Book One of the *Physics*, he has the following to say:

> But it would become apparent by looking into it that substances and whatever else are simply beings also come to be from something underlying. For there is always what underlies, from which what comes to be [comes to be], as plants and animals [come to be] from seed.
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> Things which come to be simply, however, come to be either by change of shape, like statues from bronze, or by addition, like things which grow, or by subtraction, like the Hermes from the stone, or by composition, like a house, or by alteration, as things which turn [into something else] due to their material. But it is apparent that all things which come to be thus come to be from something underlying.[13]

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most rudimentary principle of knowability or observability. It has to be known in virtue of something else. That "something else," quite naturally, will be the observable subject in accidental change, like the wood that becomes a bed or the bronze that becomes a statue. In that analogous way, then, the subject of substantial change, namely matter, is indirectly known." From his, "Matter and Predication in Aristotle," p. 45.

Aristotle's words are helpful here as well: "But when nothing perceptible persists in its identity as a substratum, and the thing changes as a whole (when e.g. the seed as a whole is converted into blood, or water into air, or air as a whole into water), such an occurrence is no longer 'alteration'. It is a coming-to-be of one substance and a passing-away of the other – especially if the change proceeds from an imperceptible something to a perceptible something (either to touch or to all the senses), as when water comes-to-be out of, or passes-away into, air: for air is pretty well imperceptible." *On Generation and Corrpution*, Bk. 1, ch. 4, 319b15-21. This translation is taken from Richard McKeon's *The Basic Works of Aristotle* (New York: Oxford University Press, 1941), p. 484. See also, *In de Gen.*, Bk. 1, *lectio* 10, vol. 3, p. 300.

[13] *Physics*, Bk. 1, Ch. 7, 190a32-190b6. This is part of the complete induction which Aristotle uses in order to help us come to see that there is some matter or material principle in every natural becoming. Regarding this induction, St. Thomas notes, "...[Philosophus] ostendit alterum quod supposuerat, scilicet quod in omni factione naturali oporteat esse subiectum. Et hoc quidem per rationem probare pertinet ad metaphysicum, unde probatur in VII Metaphys.; sed hic probat tantum per inductionem: et primo ex parte eorum quae fiunt; secundo ex parte modorum fiendi." *In Phys.*, Bk. 1, *lectio* 12, vol. 2, p. 42.

Thomists disagree about the text from the *Metaphysics* that St. Thomas has in mind here. See, for example, Fr. Lawrence Dewan, O.P., *St. Thomas and Form as Something Divine in Things* (Milwaukee, WI: Marquette

At first glance, one might wonder how this text actually helps us to understand how we come to see that there is matter which underlies substantial becoming. How does the fact that plants and animals come to be from seed show us this? Are we to think that Aristotle is claiming that the seed is the matter in question? Further, how do what seem to be various examples of accidental becoming, such

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University Press, 2007), p. 73. Fr. Dewan reports that Fr. Maggioli maintains that the text is located in chapter seven of Book Seven, while Fr. Dewan thinks that text may actually be in chapter two of Book Twelve. Ralph McInerny, on the other hand, seems to think that the text in question is found in chapter three of Book Seven. See his *The Logic of Analogy* (The Hague: Nijhoff, 1961), p. 109. It seems to me that the text from Aristotle which Fr. Maggioli has in mind is most probably the text which St. Thomas has in mind. The text in question is from chapter seven of Book Seven (i.e., 1032a15-a25), where Aristotle states: "Now natural comings to be are the comings to be of those things which come to be by nature, and that out of which they come to be is what we call matter; and that by which they come to be is something which exists naturally; and the something which they come to be is a man or a plant or one of the things of this kind, which we say are substances if anything is – all things produced either by nature or by art have matter; for each of them is capable both of being and of not being, and this capacity is the matter in each – and, in general, both that from which they are produced is nature, and the type according to which they are produced is nature (for that which is produced, e.g., a plant or an animal, has a nature), and so is that by which they are produced – the so-called 'formal' nature, which is specifically the same (though this is in another individual); for man begets man." This translation is taken from McKeon's *The Basic Works of Aristotle*, pp. 791-792. When St. Thomas says that it belongs to the metaphysician to show *per rationem* that there is some matter or material principle in every natural becoming, he seems to mean that the metaphysician shows this through the account or *ratio* of becoming or change. In other words, basing ourselves on the text just quoted from Aristotle, the metaphysician seems to argue thus: whatever comes to be by nature or by art is able both to be and not to be. Hence, there must be some principle in these things whereby they are able both to be and not to be. But the name "matter" is imposed to signify precisely that intrinsic principle whereby things are able both to be and not to be. Hence, matter is an intrinsic principle of whatever comes to be by nature or by art and, as a consequence, matter must be a principle and cause from which these things come to be. It should be noted, moreover, that the metaphysician's argument applies not only to every natural becoming but also to every becoming which has art as its principle.

Perhaps we see something of the metaphysician's reasoning, albeit *breviter*, at the beginning of the *DPN*. There St. Thomas states: "Nota quod quoddam potest esse, licet non sit, quoddam vero est. Illud quod potest esse dicitur esse potentia, illud quod iam est dicitur esse actu." Vol., 43, p. 39

The following text from Christopher Decaen is quite relevant here: "Are there any other propositions that are readily induced in one science, and yet seen again through their causes in a pedagogically posterior science? Let me briefly mention two examples: (1) that nature acts for an end, and (2) that in physics the more known is the more universal. Aristotle (and St. Thomas in his commentary) argues for the former in *Phys.* II, 8, largely by means of analogies with art and by focusing on the clear case of unintelligent animals doing intelligent things; however, in a natural theological context St. Thomas argues for this again, this time from a more metaphysical perspective (*ScG* II, 2 and 3). The latter Aristotle states in *Phys.* I, 1, giving examples or signs that are sufficient to manifest it, whereas St. Thomas, in his commentary on the same (*In Phys.* I, lect. 1, n. 7), gives an argument through the cause (the potentiality of the intellect with respect to its objects); this aspect of intellect (and apprehensive powers in general) is not formally considered until the physicist has descended to study the soul (*De anima* II, 5, and III, 4-6), but here this movement from induction to *propter quid* could be understood to occur entirely within natural science." From his, "The Impossibility of Action at a Distance," pp. 195-196. The impossibility of action at a distance is, of course, the other case of this that Decaen has in mind. In his article, he shows that the natural philosopher comes to see through induction that no natural agent can act at a distance, while the metaphysician shows the reason for this in his science.

as the shaping of bronze, make clear that there is matter which underlies substantial becoming? In answer to the first two queries just raised, Glen Coughlin states:

> One might think that the seed is what underlies the change, but this cannot be Aristotle's meaning. The seed is either the unfertilized seed, which no longer exists when the plant or animal come to be, or it is the fertilized seed, in which case it has already changed what it is. What Aristotle probably means is that there is a "prepared" or "disposed" matter from which the plant or animal comes to be. A seed is a good example of such a disposed matter. If the term from which the change begins and the term to which the change tends had nothing in common, no common material element, there would be simply be the annihilation of what was at first and the creation, *ex nihilo*, of what comes next. Whence, if there were *nothing* underlying the change, there could be no explanation of the need for a disposed matter.[14]

Likewise, in answer to the third query, Coughlin maintains:

> This argument, like the previous, seems at first to be defective. For we are investigating the generation of substances, and the examples Aristotle gives are, most of them, from "accidental change," i.e., change of the attributes of a substance, e.g., its quality or quantity. And yet Aristotle begins by saying that he is speaking of things which change simply, i.e., of "substantial change." Perhaps, then, it is best to understand the examples not as examples of substantial change, but of ways in which substantial change can occur. Aristotle uses examples of accidental change because they are more manifest to us. Do things change substantially in the ways mentioned? Yes: one can destroy an animal or plant by changing its shape too much; one can change food into an animal by "adding" it to the animal causing growth; by removing parts of an animal we can destroy it; by composing things, e.g., by putting together egg and sperm, we can generate something new; and we can destroy or generate new things by changing the quality of a substance, e.g., by heating it or electrifying it. Thus, we can induce that the ways in which something can change substantially imply some underlying matter.[15]

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[14] Aristotle, *Physics, Or Natural Hearing*, trans. Glen Coughlin (South Bend, IN: St. Augustine's Press, 2005), pp. 20-21, footnote 52.

[15] *Ibid.*, p. 21, footnote 54. John of St. Thomas too seems to understand that it is through signs such as these that we come to see that matter underlies every substantial becoming. He writes: "...si ex nihilo aliquid fieret, ita ut tota ipsa rei substantia ex nihilo fieret, hoc ipso non esset generatio, sed creatio, et corruptio esset annihilatio. Unde non requirerentur determinatae dispositiones ad determinatas generationes, sed eodem modo posset fieri lapis vel equus vel quaecumque alia res, quia ex nihilo fit, ad nihil deserviunt dispositiones, ut determinetur magis ad unum quam ad aliud." *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 3, a. 1, p. 56.

So too, Fr. W. H. Kane, O.P. He states: "If new substances were made from mere nothing in the course of

If Coughlin is correct in his understanding of Aristotle's text, then, in these two arguments, Aristotle is helping us attend to something which is common to every substantial becoming commonly understood to be such. The first argument Aristotle presents, which proceeds *ex parte eorum quae fiunt*,[16] helps us to see that in order for plants and animals to come to be, (1) certain seeds *must* be beforehand and (2) these latter *must* cease to be in order for the former to come to be.[17] But let us inquire into the reasons for these two requirements. To take up the second one first, we can ask: Why is it necessary for certain seeds to cease to be, if plants and animals are to come to be? The answer to this question, which is plain to everyone, is that there is something in the seed which

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nature, a stone or a horse or any other substance could be made in the same way, and a subject with special dispositions would not be required for the production of a substance of determined species. From experience we know that an antecedent subject with special dispositions is required for the production of water, and of a dog, and of each specific type of natural body. Hence new individual substances are made from some primary or substantial subject which is capable of receiving a new substantial actuality and of losing the substantial actuality which it previously had." From his, "The First Principles of Changeable Being," p. 55.

Matthew Kelly, on the other hand, thinks that, in order to see that there is matter that underlies every substantial becoming, all we have to do is appeal to the perceived unity of what is before us. He maintains: "When Smith becomes a cadaver, we always have before us a subject, that is, a unity of relatively permanent characteristics. The unity before us, moreover, is always this one that we continually point out and locate in time and place all the while Smith becomes a cadaver. As a result, in order to account for what happens when Smith becomes a cadaver, our experience requires that we say only, as St. Thomas puts it, since we cannot deny our experience of the continual presence of a subject before us, that the subject which is always before us that was once under one form, the form that resulted in its being the unity or subject we call "Smith," is now under another form, the form which results in its being the unity or subject we call a cadaver." Thereafter, in a footnote to this text, Kelly states: "...it is obvious that there is always a subject before us. The need is not for proof that there is a subject but for principles of difference to account for the fact that the single subject before us is the being we call "Smith" and then what we call "a cadaver." See his, *The Interpretation of St. Thomas Aquinas of Aristotle, Physics 191a7-8: "The Underlying Nature is Known by Analogy,"* unpublished doctoral dissertation (South Bend, IN: University of Notre Dame, 1963), p. 135
See also, Matthew Kelly, "St. Thomas and the Meaning and Use of 'Substance' and 'Prime Matter,'" *The New Scholasticism* 40 (1966), pp. 177-189.

For a more recent view, see Jonathan Lear, *Aristotle: The Desire to Understand* (Cambridge: Cambridge University Press, 1988), pp. 59-60.

[16] This is the phrase that St. Thomas uses in his *In Phys.*, Bk. 1, *lectio* 12, vol. 2, p. 42.

[17] It seems that the kind of necessity involved here is the hypothetical necessity which Aristotle speaks of in chapter nine of the second book of the *Physics*. See, also, *In Phys.*, Bk. 2, *lectio* 15, vol. 2, pp. 98-99.

comes to have the nature of a plant or animal.[18] And since this something cannot have the nature of a seed and the nature of a plant or animal at the same time (for this would entail an obvious contradiction), it follows that whenever this something comes to have the nature of a plant or animal it must thereby lose the nature of a seed. But this something, which comes to have the nature of a plant or animal, is precisely what we intend to signify by the name "matter." Hence, we see that the reason why certain seeds must cease to be, if plants and animals are to come to be, is because the matter, which initially has the nature of a seed and thereafter acquires the nature of a plant or animal, cannot have these two natures simultaneously.

Next, we should ask: Why must seeds and not some other kind of natural substances be beforehand, if plants or animals are to come to be? With this question as well, the answer is quite obvious. That is, the determinate substances which we call "seeds" must be, if plants and animals are to come to be, precisely because it is only when it has the nature of a certain kind of seed that the matter in the seed is disposed to receive the nature of a certain kind of plant or animal.[19] Hence, human reproductive seeds[20] must be if a man is to come to be, equine reproductive seeds must be

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[18] Hence, Ralph McInerny writes, "'Seed' here is not the permanent subject, but rather a sign that such a subject is involved." *The Logic of Analogy*, p. 143.

[19] St. Thomas distinguishes between "materia ex qua" and "materia in qua." For instance, in the first chapter of *DPN*, vol. 43, p. 39, St. Thomas writes: "Ad utrumque esse [i.e., esse substantiale et esse accidentale] est aliquid in potentia: aliquid enim est in potentia ut sit homo, ut sperma et sanguis menstruus, aliquid est in potentia ut sit album, ut homo. Tam illud quod est in potentia ad esse substantiale quam illud quod est in potentia ad esse accidentale potest dici materia, sicut sperma hominis et homo albedinis; sed in hoc differt quia materia que est in potentia ad esse substantiale dicitur materia ex qua, que autem est in potentia ad esse accidentale dicitur materia in qua." Here we are obviously speaking of a kind of "materia ex qua." See also, Aristotle's *Metaphysics*, Bk. 8, ch. 4, 1044a15-20.

[20] It is worth noting that St. Thomas predicates the name "seed" of both what the father and the mother contribute (i.e., in terms of reproductive materials) to the child. He writes: "...dicendum quod semen maris est principium activum in generatione animalis. Sed potest etiam dici semen id quod est ex parte feminae, quod est principium passivum. Et sic sub semine comprehendi possunt vires activae et passivae." *ST* I, q. 115, a. 2 *ad 3um*, vol. 5, p. 541.

if a horse is to come to be, and an acorn must be if an oak tree is to come to be, since it is only when the respective matters in the seeds have the natures of these specific seeds that they are disposed to receive the natures of a man, a horse, and an oak tree respectively. Hence, from Aristotle's first argument we see both that there is matter or a material principle in every substantial becoming in which a plant or animal comes to be, and that this matter is able to become a plant or animal only when it has the nature of the appropriate kind of seed.

Aristotle's second argument, which proceeds *ex parte modorum fiendi*,[21] is more universal than the first argument and adds to it in a certain way.[22] Assuming Coughlin's understanding of Aristotle's text, this second argument is more universal than the first since it includes not only every substantial becoming wherein a plant or animal comes to be, but also every other substantial becoming which we commonly understand to be such. Further, this second argument adds to the first argument insofar as it provides us with an additional sign that there is matter or a material principle in every substantial becoming which we commonly understand to be such. Let us address

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[21] See St. Thomas's *In Phys.*, Bk. 1, *lectio* 12, vol. 2, p. 42.

[22] William Baumgaertner shows how this second argument from Aristotle can be presented more formally as follows: "The connection of terms proper to induction can be expressed most clearly by casting this induction in the following form:

> a) In alteration, composition, and all other processes of coming to be there is a coming to be from a subject.
> b) The "coming to be" by alteration, by composition, etc., are every "coming to be."
> c) Therefore, every coming to be is from a subject.

"In the first statement the enumeration of the various ways of coming to be is made the subject of the characteristic (from the subject) which we wish to conclude of it. In the second statement we again use the enumeration as subject, but now identify it with the universal (every coming to be), whose parts the enumeration describes. Thus in the conclusion we can predicate the characteristic (from a subject) of the universal which embraces the enumeration of singulars." From his, "The Nature of Induction," *Proceedings from the American Catholic Philosophical Association* (1951), p. 132. It should be clear there here we are primarily concerned with manifesting how we come to see that the first statement in Baumgaertner's argument is true.

each of these points in turn.

In order to address the first point, we should begin by noting that in this second argument Aristotle mentions five ways to bring about a substantial becoming. These "five ways," namely, change of shape, addition, subtraction, composition, and alteration are all accidental changes which can terminate in a substantial becoming.[23] Now it is manifest from Coughlin's explanation of this argument that this argument includes within its scope every substantial becoming wherein a plant or animal comes to be. For we can readily see that it is by composition that such things as human and equine reproductive seeds come together; and, perhaps, it is by alteration that an acorn becomes an oak tree. Yet Coughlin's explanation also makes clear that this argument applies to other kinds of substantial becoming. For example, by alteration (e.g., heating or cooling) a man can become a corpse. Likewise, by addition an acorn can become the flesh of some brute animal. And so on. Now it becomes clear upon reflection that *every* sort of substantial becoming that we commonly understand to be such stands as the terminus of one (or perhaps more than one) of these aforementioned kinds of accidental change.[24] Hence, we can see that this argument includes within its scope not only every substantial becoming wherein a plant or animal comes to be, but also every other substantial becoming which we commonly understand to be such.

Now in order to see the second point mentioned above, namely, that this second argument provides us with an additional sign that there is matter or a material principle involved in every

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[23] As such, all five of these kinds of change can in some way be brought under the genus "alteration," or change in quality, which is the road to substantial change. On this point, St. Thomas writes: " Omnis forma substantialis propriam dispositionem in materia requirit, sine qua esse non potest: unde alteratio est via ad generationem et corruptionem." *De mixtione*, vol. 43, p. 155, lines 37-40.

[24] Regarding this, see *Quod.*, VII, q. 4, a. 2, vol. 25, 1, p. 21.

substantial becoming which we commonly understand to be such, it is necessary to revisit something said above.[25] In addressing the first argument, we noted that in order for certain substances to come to be (i.e., plants and animals), two things are necessary, namely, (1) certain other substances (i.e., seeds) *must* be beforehand and (2) these latter *must* cease to be in order for the former to come to be. However, in his second argument, Aristotle helps us to see the more complete account of what is necessary in order for substantial becoming to occur. For here he maintains that in order for certain substances to come to be (e.g., plants, animals, corpses, etc.), three things are necessary, namely, (1) certain other substances (e.g., seeds, living bodies, etc.) *must* be beforehand, (2) these other substances *must* be changed accidentally in a certain way, and (3) these other substances *must* cease to be.

Making this more particular, we can say that in order for a human corpse to come to be, three things are required, namely, (1) some man must be, (2) the man in question must be changed accidentally in some way (e.g., he might have his body temperature altered excessively in either direction), and (3) the man in question must cease to be. Likewise, it is true to say that in order for a man to come to be, three things are necessary, namely, (1) some human reproductive seeds must be, (2) these seeds must be changed accidentally in some way (i.e., they must be properly composed or put together), and (3) the same seeds must cease to be. Now, by considering these and other similar examples of substantial becoming, the reason for this additional requirement for substantial becoming should become evident. In other words, Aristotle is helping us to attend to the fact that the five

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[25] Here we are claiming that the "additional sign" is additional to the two sorts of signs that there is matter or a material principle which were given in the first argument. Hence, this second argument provides us with three intimately related signs that matter is involved in every substantial becoming which we commonly understand to be such. On this "additional sign," see Aristotle's *Metaphysics*, Bk. 9, ch. 7, 1049a13-18.

aforementioned kinds of accidental change lead to the ceasing to be of this substance of this kind and to the coming to be of that substance of that kind. Thus, even though, in some remote way, the matter in a man is able to have the nature of a corpse while the man is healthy, this same matter is only properly disposed to receive the nature of a corpse once the man has been accidentally changed in the appropriate sort of way. Likewise, while the matters in the human reproductive seeds are certainly able to have the nature of a man, they are only properly disposed to receive this nature once these seeds have been put together in the right conditions. Hence, the fact that these five kinds of accidental change can lead to the substantial becomings which we commonly understand to be such is yet another sign which enables us to come to see that there is matter or a material principle in all of these cases of substantial becoming.

From these considerations, then, it seems clear that Aristotle has succeeded in pointing out certain things which we know from our common experience which enable us to come to see that there is matter in every substantial becoming. In fact, it seems that it is precisely because these things which Aristotle has pointed out are so common, even quotidian, that no one (certainly none of the proponents of *Monism* or *Pluralism*) fails to see that some matter underlies every change wherein this substance of this kind becomes that substance of that kind.[26] Thus, we might say that the fact that

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[26] A helpful text from St. Thomas on this matter is the following: "...dicendum quod principium humanae cognitionis est a sensu; non tamen oportet quod quidquid ab homine cognoscitur, sit sensui subiectum, vel per effectum sensibilem immediate cognoscatur. Nam et ipse intellectus intelligit seipsum per actum suum, qui non est sensui subiectus; similiter etiam et interiorem actum voluntatis intelligit, in quantum per actum intellectus quodammodo movetur voluntas, et alio modo actus intellectus causatur a voluntate, ut dictum est, sicut effectus cognoscitur per causam, et causa per effectum. Dato tamen quod potentia voluntatis ad opposita se habens non possit cognosci nisi per effectum sensibilem, adhuc ratio non sequitur. Sicut enim universale, quod est ubique et semper, cognoscitur a nobis per singularia quae sunt hic et nunc, et materia prima, quae est in potentia ad diversas formas, cognoscitur a nobis per successionem formarum, quae tamen non sunt simul in materia: ita et potentia voluntatis ad opposita se habens cognoscitur a nobis, non quidem per hoc quod actus oppositi sint simul, sed quia successive sibi invicem succedunt ab eodem principio. *De malo*, q. 6 *ad* 18*um*, vol. 23, p. 152.

matter underlies every substantial becoming is something that is *per se notum quoad omnes*.[27]

Now before returning to the main thread of the argument above, it seems worthwhile to consider a reasonable objection against something mentioned above. The consideration of how we come to see that there is matter in every substantial becoming was introduced by the claim that, unlike the matter or material principle in accidental becoming, the matter in substantial becoming is not some sensible substance. Yet this seems to go against some of the very things known from our

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[27] Further, as is clear from the foregoing, we come to see the truth of this principle through induction (even if it belongs to the metaphysician to know this principle *per rationem*). Regarding this point, the following text from Edward Simmons is of import here: "Thus far I have used the expression "dialectical" to refer to probable argumentation. This type of dialectical discourse is supplementary to demonstration. We can also speak of a pre-demonstrative dialectic – which prepares the way for demonstration by manifesting the absolute premises of demonstration.... There is no question of a proof, in any strict sense of the word, for a self-evident proposition. Assent to the self-evident proposition depends upon and comes with an insight into the intrinsic intelligibility of the proposition itself. The assent is automatic with the insight, but the insight may be difficult to achieve. The way to insight may require long and complicated discourse involving division, definition, and even argumentation. For example, one typical dialectical device for manifesting the truth of a self-evident proposition is the reduction of its contradiction to absurdity (Cf. *In III Met.*, lect. 5, n. 392.) The important point is that once the threshold of insight is achieved the assent is made in virtue of the intrinsic intelligibility of the proposition itself. The dialectic is a scaffolding which can now be torn down, for it is not needed as a defense of the self-evident proposition once seen (no matter how instrumental it might in fact have been prior to insight). Here precisely is where the immediate induction of the principles of demonstration differs from the mediate induction of a conclusion from a sufficient enumeration of singulars. The induced conclusion is assented to precisely in virtue of the enumeration of singulars and cannot be known without pointing to them for evidence. This is not the case for the induced principle. No matter how many singular wholes and parts have to be observed before a man sees into the meaning of whole and part so that he knows the whole must be greater than its parts, the proposition is seen to be true independently of each and all of these singular wholes and parts. (*In III Sent.*, d. 24, q. 1, a. 2, a. 1 ad 2: "Termini principiorum naturaliter notorum sunt comprehensibles nostro intellectui: ideo cognitio quae consurgit de illis principiis, est visio...."). " From his, "Demonstration and Self-Evidence," *The Thomist* 24 (1961), p. 19.

Regarding the issue of the enumeration of singulars, Baumgaertner states: "The complete enumeration is required for the validity of the formal consequence of the induction itself. This does not mean that in every good induction we must count out all the cases one by one and have experience of each one; it means, rather, that this note of universality must be present in the enumeration from the point of view of formal logic, i.e., for the formal consequence which permits us to pass from the parts to the whole. This note of universality will be present if we at least say, *et sic de aliis*, after the particular cases which we cite. We are distinguishing here the universal which pertains to the domain of formal logic from the universal which pertains to material logic. For example, when I say 'Every man is rational,' or 'Every whole is greater than any of its parts,' I have not merely the form of a universal statement, but I see the necessary universal connection on the part of the matter. On the other hand, when I say 'Every mother loves her child,' I preserve the same universal form of statement, but I do not see the necessity of the connection on the part of the matter. It is my mind that completes and confers the universality." See his, "The Nature of Induction," p. 134.

common experience which we have been striving to preserve. For, to take an example, when a man becomes a corpse, there does indeed seem to be some substance, demonstrable to sense, which underlies the change. The evidence for this is that if the man dies from natural causes, then, immediately after death, the size, shape, color, and various other attributes of the corpse seem to be the very same accidents that were present in the man. But in order for the accidents of the corpse to be the same as those of the man, it is necessary that the accidents have as their subject some substance which changes from being this man to being this corpse. Hence, it seems that when a man becomes a corpse, there is some substance, demonstrable to sense, which underlies the change. Further, something similar could be said about other instances of substantial becoming. So, in contradiction to what was said above, it seems in accord with what we know from our common experience to say that in substantial becoming there is always some substance, demonstrable to sense, which underlies the change.

In reply to this objection, we concede that the accidents of the man and of the corpse are one in species, but we deny what the objection maintains, namely, that these accidents are one in number. For accidents which belong to numerically distinct substances are themselves numerically distinct.[28] Why, for example, do we think that Socrates's color and shape are numerically distinct from Plato's color and shape? The reason is that the color and shape of Socrates are the color and shape of a substance which is numerically distinct from Plato (who, in turn, has his own color and shape). Or, put more universally, accidents depend on the substances in which they inhere both in order to be and in order to be individuated. Applying this principle to the case at hand, Charles De Koninck states:

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[28] In *De virtutibus*, q. 1, a. 11, vol. 2, p. 739, St. Thomas teaches: "Dualitas...in formis unius speciei non potest intelligi nisi per alietatem subiecti. Formae enim unius speciei non diversificantur numero nisi per subiectum."

> Let us take the classic example of the cadaver which has all the signs characterizing the individual who just died. Are we confronted with the same signs? Do we not say that this is the cadaver of such an individual? Would there be perfect discontinuity between the nose of Mr. X and the nose of the cadaver to the point of not being able even to say that nose *was* the nose of Mr. X?
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> From an experimental point of view, the configuration of the nose has not changed, but from an ontological point of view it is absurd to say that the nose of the cadaver was the nose of Mr. X, since there exists between composite Mr. X and the composite cadaver, a substantial opposition, a perfect ontological discontinuity. But the substance is the root of the accidents of the subject. Therefore, if the composite B is absolutely other than the composite A, to the point of not even being able to say that B was A (which would pose the impossible case of two substances being one), *a fortiori*, the nose of the cadaver cannot be that of Mr. X.[29]

The point here is that since a man and his corpse are numerically distinct substances, it necessarily follows that the man's parts and accidents and his corpse's parts and accidents are numerically distinct. Hence, if a man dies from natural causes, then, immediately after death, the size, shape, color, and various other attributes of the corpse must be *numerically distinct* from the accidents that were present in the man.

Now while this objection fails to refute our claim made above, namely, that the matter in substantial becoming is not some sensible substance, it does make us attend to the fact that in many instances of substantial becoming the substance which comes to be has accidents which are one in species with the accidents of the substance which ceases to be. Thus, not only in the case of the man becoming a corpse, but also in the case of the horse becoming the remains of a horse, and in the case the oak tree becoming the remains of an oak tree, we observe that many of the accidents which belong to the latter three substances are one in species with the accidents which used to belong to the former three substances. What accounts for this phenomenon? While we cannot give a complete answer to

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[29] *The Writings of Charles De Koninck*, p. 282

this question at this point,[30] we can say this: it seems that whatever agent introduces the accidental change which leads to substantial becoming not only disposes the matter of the natural substance which it is presently changing to receive the nature of some new substance, but also disposes this same matter to become part of a substance with accidents which are one in species with the accidents of the substance which ceases to be. Thus, when Mr. Smith is about to die from a terminal illness, his matter is not only being disposed to become part of a human corpse, but is also being disposed to become part of a human corpse with accidents one in species with those belonging to Mr. Smith.[31] By grasping this objection and the proper response to it, perhaps we can understand more distinctly that while, through the sensible signs set forth by Aristotle above, we come to see that there is matter which underlies every substantial becoming, we also see that this matter is not some sensible substance (as is the matter in accidental becoming).

## 6. The Principles of Becoming

Now just prior to taking up the question of how we come to see that there is matter in every substantial becoming, we were about to conclude that what we had named "matter," "form," and "privation" are indeed found both in every accidental becoming and in every substantial becoming. For we found that in every accidental becoming some matter acquires a form which it previously

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[30] In chapter nine we shall attempt to address this question more completely.

[31] Cajetan maintains that the accidents in the corpse which are one in species with those which were in the living body follow "ex necessitate materiae." He writes, "...dicitur quod figura, cicatrix et hujusmodi producuntur consecutive, et per accidens, a generante eorum subjectum, scilicet cadaver: nec est verum, quod sola illa accidentia generentur consecutive, quae sequuntur formam; sed multa accidentia sequuntur compositum ex necessitate materiae, quae sunt, licet non incompossibilia, aliqualiter tamen opposita formae, ut patet de se. Et ideo dico, quod figura et similia sequuntur cadaver ex necessitate materiae, quia scilicet agens naturale non potest tam cito dispositiones per tot transmutationes radicatas corrumpere totaliter, et ideo similes dispositiones sequuntur: et quia non sunt facientes pro forma geniti, ideo ad corruptionem properatur," *Commentaria in De Ente et Essentia*, c. 7, q. 17.

lacked. Likewise, we found that in every substantial becoming some matter acquires a form which it previously lacked. But since accidental becoming and substantial becoming are the only kinds of becoming, we can now say universally that in every becoming matter acquires a form which it previously lacked. Hence, it is true to say that matter, form, and privation are indeed found in every becoming.

But granted this, it is not difficult to show that matter, form and privation are also principles or beginnings of every becoming. Through a consideration of the nature of becoming itself, John of St. Thomas manifests this fact in a helpful text from the *Cursus Philosophicus*. He writes:

> That there must be three principles for the generation or coming to be of a natural thing, namely, matter, form, and privation, is proved from the very nature of change. Furthermore, we should not say that these three principles are intrinsic to generation because they intrinsically make up generation, but rather because generation essentially depends on them. For indeed, every positive change is essentially a transition from something not existing to something existing. And this because [every positive change] makes something new [to be]. For, if nothing new were made [to be], but that which previously was just remained, there would be no change. But if something new is posited, it must be that before it was not and that now it is. Therefore, it must necessarily come to be from a privation or from non-existence, and thus privation is a principle of change. Now it is manifestly the case that matter is required, since change cannot occur unless something is changed from one thing to another, such that the terms of the change themselves follow one another in the same subject. For the succession of one to the other outside of every subject does not change anything from one thing to another. But we call the subject of change matter. Furthermore, that form is required is manifest, since it is the intended term to which the change tends. And, thus, it is called a principle of change since it is intended first and in virtue of itself. Thus, it is first in the order of intention, although it is last in the order of execution, where the whole motion is finished.[32]

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[32] Quod vero dentur tria principia pro generatione seu fieri rei naturalis, scilicet materia, forma et privatio, probatur ex ipsa natura mutationis. Et quidem supponimus non dici ista tria principia intrinseca generationis, quia generationem intrinsece componant, sed quia generatio ab illis essentialiter dependet. Etenim omnis mutatio positiva essentialiter est transitus de aliquo non esse ad aliquod; facit enim aliquod de novo, alioquin non mutaret, si nihil novi faceret, sed id, quod antea erat, permaneret. Si autem aliquid de novo ponitur, oportet, quod antea non fuerit et nunc sit. Ergo necessario debet fieri ex privatione seu ex non esse, et sic *privatio* principium mutationis est. Quod vero requiratur *materia*, constat manifeste, quia mutatio non fit, nisi transmutetur aliquid de uno ad aliud, ita quod ipsi termini mutationis succedant in aliquo subiecto. Successio enim unius ad aliud extra omne subiectum nihil

Here we come to see that matter, form, and privation are principles of every becoming insofar as it is manifest that every becoming or generation "essentially depends on them."[33] Now the first principle of becoming that John of St. Thomas argues to here is privation. He makes the point that every becoming results in there being something new in that which underlies the becoming. Indeed, if, at the end of the becoming, there were nothing new in what underlies the becoming, we would be bound to say that what underlies the becoming did not change at all. But in order for there to be something new in what underlies the becoming at the end of the becoming, this something new must not be in what underlies the becoming at the beginning of the becoming. Rather, at the beginning of the said becoming, what underlies the becoming must lack what it will come to have in itself. Hence,

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transmutat de uno ad aliud. Subiectum autem mutationis materiam dicimus. Denique quod requiratur *forma*, manifestum est, cum sit terminus intentus, ad quem tendit mutatio. Et sic dicitur principium mutationis, quia est primo et per se intentum, et sic est primum in intentione, licet in executione sit ultimum, ubi consummatur totus motus. *Cursus Philosophicus*, *Nat. Phil.*, p. 1, q. 2, a. 3, p. 51-52. It seems probable that John of St. Thomas has in mind here what St. Thomas says in *De potentia*, q. 3, a. 2, vol. 2, p. 41.

[33] For the chief meanings of the name "principle," see *Metaphysics*, Bk. 5, ch. 1 together with *lectio* 1 of St. Thomas's *In Metaphys.* on that same book. In chapter three of *DPN*, vol. 43, pp. 41-42, St. Thomas has the following to say regarding the name "principle" as it applies to the *principia naturae*: "Ex dictis ergo patet, quod sunt quatuor causae: scilicet materialis, efficiens, formalis et finalis. Licet autem principium et causa dicantur convertibiliter, ut dicitur in quinto Metaph., tamen Aristoteles in Lib. Physic., ponit quatuor causas et tria principia. Causas autem accipit tam pro extrinsecis quam pro intrinsecis. Materia et forma dicuntur intrinsecae rei, eo quod sunt partes constituentes rem; efficiens et finalis dicuntur extrinsecae, quia sunt extra rem. Sed principia accipit solum causas intrinsecas. Privatio autem non nominatur inter causas, quia est principium per accidens, ut dictum est. Et cum dicimus quatuor causas, intelligimus de causis per se, ad quas tamen causae per accidens reducuntur, quia omne quod est per accidens, reducitur ad id quod est per se. Sed licet principia ponat Aristoteles pro causis intrinsecis in primo Physic., tamen, ut dicitur in undecimo Metaph., principium dicitur proprie de causis extrinsecis, elementum de causis quae sunt partes rei, idest de causis intrinsecis, causa dicitur de utrisque. Tamen aliquando unum ponitur pro altero. Omnis enim causa potest dici principium, et omne principium causa. Sed tamen causa videtur addere supra principium communiter dictum, quia id quod est primum, sive consequatur esse posterius sive non, potest dici principium, sicut faber dicitur principium cultelli, ut ex eius operatione est esse cultelli. Sed quando aliquid movetur de nigredine ad albedinem, dicitur quod nigrum est principium illius motus; et universaliter omne id a quo incipit esse motus dicitur principium: tamen nigredo non est id ex quo consequatur esse albedo. Sed causa solum dicitur de illo primo ex quo consequitur esse posterioris: unde dicitur quod causa est ex cuius esse sequitur aliud. Et ideo illud primum a quo incipit esse motus, non potest dici causa per se etsi dicatur principium: et propter hoc privatio ponitur inter principia, et non inter causas, quia privatio est id a quo incipit generatio. Sed potest etiam dici causa per accidens, inquantum concidit materiae, ut supra expositum est."

we see from this reasoning that there cannot be becoming without privation and, hence, John of St. Thomas is right to call it a principle of becoming.

Regarding matter as a principle of becoming, John of St. Thomas's argument seems to amount to essentially this: becoming only occurs when *one and the same thing* at first lacks a certain something in itself and later has that same something in itself. Hence, in order for becoming to occur, there must be something common to the term-from-which and the term-to-which.[34] For, if there were nothing common to that from which the becoming begins and that at which the becoming terminates, we could not speak of any*thing* becoming; for no *one thing* would be changing or coming to be at all. Hence, we see that in order for becoming to be, there must be something which is common to the terms of the becoming and which is properly said to become or come to be. This principle of becoming is, of course, matter.

Lastly, John of St. Thomas shows that form is a principle of becoming. "Form" here is simply taken to mean "the intended term to which the change tends." We saw that privation is a principle of becoming since it is necessary for something to lack what it will come to have. Now, in a similar way, we can maintain that form is a principle of becoming since, in order for becoming to be, something must come to have in itself what it previously lacked. In addition to this, John of St. Thomas illustrates the point that form seems to be the defining principle of becoming. For it is the very thing intended or aimed at, firstly and in virtue of itself, in the becoming. Hence, without form there can be no becoming.

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[34] Regarding the term-from-which and the term-to-which in becoming, St. Thomas writes: "...terminus generationis in creaturis potest accipi dupliciter, sicut etiam et principium. Dicitur enim principium generationis ipsum generans; et huic principio correspondet sicut terminus ipsum genitum. Dicitur etiam principium generationis a quo incipit generatio, et hoc modo principium vel initium generationis est privatio formae inducendae; et huic principio terminus oppositus est forma per generationem inducta." *In Sent.*, Bk. 1, d. 5, q. 3, a. 1, vol. 1, p. 158.

In addition to helping us to see that matter, form, and privation are principles of every becoming, John of St. Thomas's text also provides us with an occasion to note that these same principles are distinct from each other. By this point, indeed, it is quite clear that form and privation are distinct principles since they are opposed to each other. For, as St. Thomas made clear above, privation is precisely the non-being of a form in matter which is able to have that form.

But it is also quite easy to see that matter is distinct from the other two principles. For, if we consider what is involved in becoming, we see that matter first lacks some form and later has that form. Now since it can lack a given form, matter must be a principle distinct from that form. Likewise, since it can have a given form (and, thus, no longer lack it), matter must be a principle which is also distinct from the privation of the form under consideration. But these same points can be made with respect to any form and its corresponding privation. Hence, speaking generally, we can state that matter is a principle of becoming which is distinct from both form and privation.[35]

With these considerations in mind, it is worthwhile to think back to one of the main points regarding the *principia naturae* that was established, *per modum disputationis*, in chapter five. For there we observed it to be probable that there are three principles of nature, namely, some material principle and two other principles which stand to each other as first contraries. By slight contrast, here we have established, *per modum demonstrationis*, that there are indeed three principles of nature, to wit, some material principle[36] and two other principles which stand to each other as form to

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[35] On this point, St. Thomas says, "Ex dictis igitur patet quod materia differt a forma et a privatione secundum rationem. Materia enim est id in quo intelligitur forma et privatio: sicut in cupro intelligitur figura et infiguratum." *DPN*, ch. 2, vol. 43, p. 41.

[36] We are not affirming at this point that the matter in every becoming is one in number. Clearly in many cases of accidental becoming this is so. For example, when Mr. Smith becomes musical, it is manifest that the matter

privation.

Seeing this difference, we can say that the probable account of the principles of nature given in chapter five partially captures the truth and partially misses the truth. On the one hand, this account partially captures the truth insofar as it posits that the principles of nature are some material principle and two other principles which are opposed to each other. On the other hand, this same account partially misses the truth insofar as it states that the kind of opposition found between the opposed principles consists in the opposition of contrariety. In contradiction to this, we showed above that the kind of opposition which is truly found to exist between these principles (i.e., between form and privation) is the more fundamental opposition of possession and privation. Hence, it is clear that the probable account of the principles of nature given in chapter five was finally not quite general enough.[37]

## 7. Another Way of Considering These Principles

Up to this point we have been considering two of the three principles of every becoming (i.e., form and privation) insofar as they are opposed to each other, and the remaining principle (i.e., matter) insofar as it underlies the former two principles. There is, however, another way in which we

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(i.e., Mr. Smith) is one in number. The situation in substantial becoming, however, is not so clear. Yet, since at this point we have no need to posit more than one material principle in a substantial becoming, we shall not speak as if there is more than one such principle.

[37] St. Thomas makes this point in *lectio* 13 of his commentary on *Physics*, Bk., 1, ch. 7. He writes: "...in motu requiruntur duo contraria et unum subiectum. Sed in generatione et corruptione requiritur praesentia unius contrarii et absentia eius, quae est privatio. Generatio autem et corruptio salvantur in motu: nam quod movetur de albo in nigrum, corrumpitur album et fit nigrum. Sic igitur in omni mutatione naturali requiritur subiectum et forma et privatio. Non autem ratio motus salvatur in omni generatione et corruptione, sicut patet in generatione et corruptione substantiarum. Unde subiectum et forma et privatio salvantur in omni mutatione; non autem subiectum et duo contraria.

Haec etiam oppositio invenitur in substantiis, quae est primum genus, non autem oppositio contrarietatis: nam formae substantiales non sunt contrariae, licet differentiae in genere substantiae contrariae sint, secundum quod una accipitur cum privatione alterius, sicut patet de animato et inanimato." *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 46.

can consider these same three principles of becoming. That is, we can consider all three of them insofar as they are principles from which what comes to be comes to be. Viewed in this way, two of these three principles (i.e., matter and form) are principles from which what comes to be comes to be *per se*, while the remaining principle (i.e., privation) is a principle from which what comes to be comes to be *per accidens*.[38] Regarding the former, Aristotle says:

> ...if there are causes and principles of things which are by nature, from which things they first are and come to be, not accidentally, but what each is according to its substance, all things come to be from the underlying and form. For musical man is in some way composed from man and musical. For you resolve the accounts into the accounts of these. It is clear, then, that things which come to be would come to be from these.[39]

Further, the Angelic Doctor provides us with the following explication of this text:

> Those are said to be principles and causes of natural things from which they are and come to be *per se*, not accidentally. But everything which comes to be, is and comes to be from subject and form. Therefore, subject and form are the *per se* causes and principles of everything which comes to be according to nature.
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> But that what comes to be according to nature, comes to be from subject and form, he [i.e., Aristotle] proves in this way. Those things into which the definition of something is resolved, are the components of that thing, since each thing is resolved into those things from which it is composed. But the account of that which comes to be according to nature is resolved into subject and form. For the account of musical man is resolved into the account of man of into the account of musical. For, if

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[38] John of St. Thomas seems to contrast these two ways of considering the principles of becoming in the following text: "Principia rerum in facto esse et ut componentia non sunt contraria, principia vero in fieri et in generari contraria sunt, non ratione materiae, sed ratione privationis et formae in materia.

Utraque pars est communis auctorum. Et prima manifeste patet, quia materia et forma in ipso composito non se expellunt, sed mutuo iunguntur, ergo non sunt contraria. Constat autem materiam et formam esse partes componentes ipsum totum, et materiam appetere formam et e contra, ergo non habent inter se contrarietatem, sed appetitum.

Secunda vero pars probatur, quia ubicumque est fieri et motus, datur positio unius et ablatio alterius; generatio enim unius est corruptio alterius. Ergo datur contrarietas seu oppositio inter id, quod corrumpitur et generatur, seu inter formam, quae est terminus ad quem, et id, quod est terminus a quo. Et quia omnis contrarietas exercetur in aliquo subiecto, necesse est, quod forma et privatio solum sint contraria, prout in materia, et materia prout privata etiam incompossibilitatem habet cum ipsa forma, qua privata est." *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 2, a. 2, p. 44.

[39] *Physics*, Bk. 1, ch. 7, 190b18-b24.

someone wants to define musical man, he must give a definition of man and of musical. Therefore, that which comes to be according to nature, is and comes to be from subject and form.

And it must be noted that here he [i.e., Aristotle] intends to inquire into the principles not only of becoming, but also of being; whence he signally says "from which they first are and come to be." And he says, "from which...first," that is, *per se* and not accidentally. Thus, the *per se* principles of everything which comes to be according to nature are subject and form.[40]

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[40] Illa dicuntur esse principia et causae rerum naturalium, ex quibus sunt et fiunt per se, et non secundum accidens; sed omne quod fit, est et fit ex subiecto et forma; ergo subiectum et forma sunt per se causae et principia omnis eius quod fit secundum naturam. Quod autem id quod fit secundum naturam, fit ex subiecto et forma, probat hoc modo. Ea in quae resolvitur definitio alicuius rei, sunt componentia rem illam; quia unumquodque resolvitur in ea ex quibus componitur. Sed ratio eius quod fit secundum naturam, resolvitur in subiectum et formam: nam ratio hominis musici resolvitur in rationem hominis et in rationem musici; si quis enim velit definire hominem musicum, oportet quod assignet definitionem hominis et musici. Ergo id quod fit secundum naturam, est et fit ex subiecto et forma. Et notandum est quod hic intendit inquirere principia non solum fiendi, sed etiam essendi: unde signanter dicit *ex quibus primis sunt et fiunt.* Et dicit *ex quibus primis*, idest per se et non secundum accidens. Per se ergo principia omnis quod fit secundum naturam, sunt subiectum et forma. *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45. This text points out that we come to know that those things which come to be by nature are composed of matter and form through resolving them with our minds into matter and form. But finally we are able to resolve those things which come to be by nature into matter and form precisely because they are composed of matter and form.

In some texts, St. Thomas presents this resolution *breviter*. For example, in *In Metaphys.*, Bk. 8, *lectio* 4, p. 505 (#1746) he states: "omne...quod fit, fit ex aliquo, scilicet materia, et fit aliquid, ad quod terminatur generatio, quod est forma: et sic omne quod fit, est compositum ex materia et forma." And in *DPN*, ch. 2, vol. 43, p. 41, St. Thomas argues as follows: "Et sciendum quod materia prima, et etiam forma, non generatur neque corrumpitur, quia omnis generatio est ad aliquid ex aliquo; id autem ex quo generatio est materia, id ad quod est forma: si igitur materia vel forma generaretur, materie esset materia et forme forma in infinitum. Unde generatio non est nisi compositi per se loquendo."

Later on, in *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45, St. Thomas notes that privation too is a principle, a *per accidens* one to be sure, not only of becoming, but also of being. He says: "Posset autem aliquis obiicere quod privatio non accidit subiecto quando est sub forma; et sic privatio non est principium essendi per accidens. Et ideo dicendum quod materia nunquam est sine privatione: quia quando habet unam formam, est cum privatione alterius formae. Et ideo dum est in fieri aliquid quod fit (ut homo musicus), in subiecto quando nondum habet formam, est privatio ipsius musicae; et ideo principium per accidens hominis musici in fieri est non musicum; hoc enim accidit homini dum fit musicus. Sed quando iam advenit ei haec forma, adiungitur ei privatio alterius formae; et sic privatio formae oppositae est principium per accidens in essendo. Patet ergo secundum intentionem Aristotelis quod privatio, quae ponitur principium naturae per accidens, non est aliqua aptitudo ad formam, vel inchoatio formae, vel aliquod principium imperfectum activum, ut quidam dicunt, sed ipsa carentia formae vel contrarium formae, quod subiecto accidit."

This, however, seems to contradict what he teaches in *DPN*, ch. 2, vol. 43, pp. 40-41. There he states: "Sed in hoc [privatio] differt ab aliis, quia alia sunt principia et in esse et in fieri. Ad hoc enim quod fiat idolum, oportet quod sit aes, et quod ultima sit figura idoli; et iterum, quando iam idolum est oportet haec duo esse. Sed privatio est principium in fieri et non in esse: quia dum fit idolum, oportet quod non sit idolum. Si enim esset, non fieret, quia quod fit non est, nisi in successivis. Sed ex quo iam idolum est, non est ibi privatio idoli, quia affirmatio et negatio non sunt simul, similiter nec privatio et habitus. Item privatio est principium per accidens, ut supra expositum est, alia duo sunt principia per se."

This apparent contradiction is resolved by noting that in these two texts St. Thomas is speaking of different privations. In other words, the privation which he calls "principium per accidens in essendo," in the first text, is not the same privation which he says is "principium in fieri et non in esse," in the second text. If clay with a cubical

When we say, therefore, that what comes to be (e.g., musical man) comes to be *per se* from matter and form (e.g., man and music), what we mean to say is that what comes to be (e.g., musical man) comes to be from matter and form *in virtue of themselves* (e.g., man and music *in virtue of themselves*). For, as St. Thomas makes manifest, we resolve what comes to be (e.g., musical man) into nothing other than these principles (e.g., man and music). As such, it is fitting to name matter and form (e.g., man and music) the "*per se* principles and causes" of whatever comes to be (e.g., musical man).[41]

On the other hand, privation is a principle from which what comes to be comes to be *per accidens*. For, unlike matter and form, privation (e.g., the lack of music) is a principle which *happens* to one of the *per se* principles and causes (i.e., matter) of what comes to be (e.g., musical man). Thus, it is fitting to call privation (e.g., the lack of music) a "*per accidens* principle and cause" of whatever comes to be (e.g., musical man).[42] Explaining this somewhat, St. Thomas states:

> And he [i.e., Aristotle] says that although the subject is one in number, nevertheless, it is two in species or account, as was said above; since man or gold and every other

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shape changes so as to have a spherical shape, then the privation of the shape of a sphere is a principle of the clay's becoming spherical, but not of its being spherical. Nevertheless, the privation of a cubical shape which is necessarily adjoined to the spherical clay is a "principium per accidens in essendo" of the latter.

[41] It is essential to note here that both Aristotle and St. Thomas make it manifest that matter and form are not only principles and causes from which what comes to be comes to be *per se*, but they are also principles and causes from which what comes to be is *per se* after it has come to be. Indeed, it seems that we see the latter truth through seeing the former truth. In other words, it is through seeing that matter and form are the principles which must come together in order for what comes to be to come to be, that we come to see that these same principles are the principles which must remain together in order for what now is to continue to be what it is. St. Thomas also calls matter and form the "universalia elementa." See, *In de Caelo*, Bk. 3, *lectio* 8, vol. 3, p. 256.

[42] The meanings of "*per se* principle and cause" and "*per accidens* principle and cause" which we are employing here are the same meanings that St. Thomas has in mind in *DPN*, ch. 5, vol. 43, p. 45. He states: "Causa per se dicitur causa alicuius rei in quantum huiusmodi, sicut edificator est causa domus et lignum materia scamni. Causa per accidens est illa que accidit cause per se, sicut cum dicimus 'Grammaticus edificat'; grammaticus enim dicitur causa edificationis per accidens, non enim in quantum grammaticus sed in quantum accidit edificatori. Et similiter est in aliis causis."

> matter has a certain number. For it is one thing to consider the subject itself, which is something positive from which something comes to be *per se* and not accidentally, as a man and gold. And it is another thing to consider that which happens to it, namely, contrariety and privation, as unmusical and unshaped. But the third thing is the species and form, as the order and form of the house, or the music of the musical man, or some of the other things which are said in this way.
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> Thus, form and subject are the *per se* principles of that which comes to be according to nature; but privation or the contrary is a principles *per accidens*, insofar as it happens to the subject. For just as we say that the builder is the active cause of the house *per se*, but that music is the active cause of the house *per accidens*, insofar as it happens to the builder to be musical; in the same way man is the cause *per se* as subject of musical man, but non-musical is the cause and principle of him [i.e., musical man] *per accidens*.[43]

Nevertheless, speaking of privation as a "*per accidens* principle and cause" raises certain difficulties. As John of St. Thomas puts it:

> In what way, therefore, does the Philosopher say that privation is a *per accidens* principle [*principium per accidens*] in this book text 66 [i.e., in *Physics*, Book One, Chapter Seven], if it is required *per se* for generation? Nor does it suffice to say that because it happens to the material it is named a *per accidens* principle. For in this way even form would be said [to be a *per accidens* principle] since it happens to the material that such a form comes to it.[44]

This text inquires into the reason why the Philosopher refers to privation as a *per accidens* principle of becoming. For it seems strange that something which is not accidental to becoming, should be

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[43] Et dicit quod licet subiectum sit unum numero, tamen specie et ratione est duo, ut supra dictum est; quia homo et aurum et omnis materia numerum quendam habet. Est enim ibi considerare ipsum subiectum, quod est aliquid positive, ex quo fit aliquid per se et non per accidens, ut hoc quod est homo et aurum; et est ibi considerare id quod accidit ei, scilicet contrarietatem et privationem, ut immusicum et infiguratum. Tertium autem est species vel forma, sicut ordinatio est forma domus, vel musica hominis musici, vel aliquod aliorum quae hoc modo praedicantur. Sic igitur *forma* et *subiectum* sunt principia *per se* eius quod fit secundum naturam; sed *privatio* vel *contrarium* est principium *per accidens*, inquantum accidit subiecto; sicut dicimus quod aedificator est causa activa domus per se, sed musicum est causa activa domus per accidens, inquantum accidit aedificatori esse musicum. Et sic homo est causa per se, ut subiectum, hominis musici; sed non musicum est causa et principium eius per accidens. *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45.

[44] Quomodo ergo Philosophus privationem dicit esse principium per accidens in hoc libro textu 66, si per se requiritur ad generationem? Nec sufficit dicere, quod quia accidit materiae, appellatur principium per accidens; nam hoc modo etiam forma sic diceretur, quia accidit materiae, quod talis forma illi adveniat. *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 2, a. 3, p. 52.

called a "*per accidens*" principle. Now in addition to stating this query, John of St. Thomas also poses an objection to a certain possible answer to it. That is, he maintains that it is not sufficient to say that privation is a *per accidens* principle insofar as it happens to matter. For, if this were the cause of a principle's being *per accidens* in nature, then form would perforce be a *per accidens* principle as well. But, as we saw above, the Philosopher unequivocally calls form a *per se* principle and cause both of the becoming and of the being of whatever comes to be. Hence, it seems that we must add something to the notion of "happening to matter" if we are to explain the *per accidens* nature of privation as a principle in this context.

Finally, though, it is not too difficult to untie these knots. John of St. Thomas provides us with the answers to these problems as well. He writes:

> From St. Thomas's commentary on that text, in lecture 13, we can say that privation is called a *per accidens* principle with respect to matter, as it [i.e., the matter] is taken to compose the whole itself. For matter, which is taken as composing, is not taken by reason of the privation, but by reason of its being, although that being has the privation adjoined to it when it is drawn to constitute the whole. But in this order of constituting [the whole] form is not related *per accidens*, although it may be said to happen to matter, considered in itself. Moreover, with respect to change itself, insofar as it is a transition from non-being to being, privation is not related *per accidens* since without it one cannot understand that something comes to be in a new way unless it previously was not. And thus the aspect of newness involved in change necessarily requires privation as the term-from-which.[45]

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[45] Respondetur ex D. Thoma super illum textum, lect. 13, quod privatio vocatur principium per accidens respectu materiae, ut ad componendum ipsum totum assumitur. Materia enim, quae assumitur ad componendum, non assumitur ratione privationis, sed ratione entitatis, licet illa entitas habeat privationem adiunctam, quando trahitur ad constituendum totum. In hoc autem ordine constituendi forma non per accidens se habet, licet materiae secundum se consideratae dicatur accidere. Ceterum respectu ipsius mutationis, ut est transitus de non esse ad esse, privatio non se habet per accidens, quia sine ipsa non potest intelligi, quod aliquid de novo fiat, nisi ante non sit. Et sic novitas mutationis necessario constat privatione ut termino a quo. *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 2, a. 3, p. 52.

In a later text, John of St. Thomas reaffirms and somewhat clarifies this response. He writes: "Ad secundum iam supra respondimus, q. 2, quod privatio non est principium per accidens respectu generationis et fieri, sed respectu compositionis, vel potius respectu extremi componentis, quod est materia. Cum enim in ipsa subiectetur privatio, per accidens est in materia ut componente, quod habeat adiunctam privationem vel habuerit. Nec enim privatio ad componendum conducit, sicut statua fit per se ex aere, per accidens autem ex carentia figurae seu ex aere

This response distinguishes two different ways in which we can consider matter. First, we can consider matter in itself. Considered in this way, both privation and even form can be said to be *per accidens* to matter. For, strictly speaking, both of these principles are outside of the essence of matter.[46] Second, we can consider matter insofar as it is an essential component part of what comes to be. If we understand matter in this way, then whatever does not belong to matter precisely as such (i.e., precisely qua essential component part of what comes to be) is *per accidens* to it. But it is evident that privation does not belong to matter precisely as such (i.e., precisely qua essential component part of what comes to be). For privation is a principle of becoming which does not enter into the essence of what comes to be. Rather, it is a principle of becoming which is left behind. Thus, privation is *per accidens* to matter considered in this way.

The same, however, cannot be said regarding form. For the latter does indeed belong to matter precisely qua essential component part of what comes to be. This is seen most evidently from the fact that matter and form are *joint* essential component parts of what comes to be.[47] For, along with

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ut infigurato. Sicut autem non est inconveniens, quod principium dicatur analogice de corde et de fonte et de fundamento, quia ly principium non significat aliquam naturam communem omnibus principiis, sed modum originandi, ita non est inconveniens, quod principium dicatur analogice de privatione et materia propter diversum modum principiandi extrinsece vel intrinsece, ut ens et ut negatio." *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 5, a. 1, pp. 99-100.

[46] The meaning of "per accidens" here seems to be the one which, in the following text, St. Thomas says is common to every accident: "...dicendum quod tria sunt genera accidentium: quaedam enim causantur ex principiis speciei, et dicuntur propria sicut risibile homini; quaedam vero causantur ex principiis individui. Et hoc dicitur quia, vel habent causam permanentem in subiecto, et haec sunt accidentia inseparabilia, sicut masculinum et femininum et alia huiusmodi; quaedam vero habent causam non permanentem in subiecto, et haec sunt accidentia separabilia, ut sedere et ambulare. Est autem commune omni accidenti quod non sit de essentia rei, et ita non cadit in definitione rei. Unde de re intelligimus quod quid est, absque hoc quod intelligamus aliquid accidentium eius. Sed species non potest intelligi sine accidentibus quae consequuntur principium speciei. Potest tamen intelligi sine accidentibus individui etiam inseparabilibus. Sine separabilibus vero esse potest non solum species, sed et individuum. Potentiae vero animae sunt accidentia sicut proprietates. Unde licet sine illis intelligatur quid est anima, non autem animam sine eis esse est possibile neque intelligibile." *De anima*, q. 12 *ad 7um*, vol. 24, 1, p. 111.

[47] See *Physics*, Bk., 1, ch. 9, 192a13 and *In Phys.*, Bk. 1, *lectio* 15, vol. 2, p. 53.

matter, form makes up the composite which comes to be.[48] In truth, matter can be considered to be an essential component part of what comes to be, only if it is considered together with form. Hence, in the order of constituting the composite, as John of St. Thomas puts it, form is related to matter *per se*.

In addition to all of this, John of St. Thomas seems to be correct in maintaining that when we consider privation in its relation to becoming, we cannot understand it to be a *per accidens* principle. For without privation, the notion of becoming ceases to be intelligible. That is, something cannot come to be in some new way if it does not lack that new way of being. For example, a piece of marble cannot come to have the shape of Mr. Smith in it, unless it lacks that very shape before coming to have it. Hence, according to John of St. Thomas, in its relation to becoming itself, privation is properly seen to be a *per se* principle.[49] Put *breviter*, then, John of St. Thomas's response to the aforementioned difficulties seems to come to this: it is true to say that privation is a "*per accidens* principle and cause" from which what comes to be comes to be, but it is false to say that

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[48] Our claim here is not that the composition of matter and form is the only composition in natural substances, but that it is the most fundamental composition which belongs to natural substances precisely as natural substances. Regarding what he calls "physical and natural composition," St. Thomas writes: "...dicendum quod compositio physica et naturalis est multiplex. Est enim compositio mixti ex elementis; et in hac compositione loquitur philosophus quod oportet formam mixti esse aliud omnino ab ipsis elementis. Est etiam compositio formae substantialis et materiae, ex qua resultat tertium, scilicet forma speciei: quae quidem non est aliud omnino a materia et forma, sed se habet ad eas ut totum ad partes. Est etiam compositio subiecti et accidentis in qua non resultat aliquid tertium ex utroque: et talis est compositio potentiae et habitus." *De veritate*, q. 16, a. 1 *ad* 16*um*, vol. 22, p. 507. For a list of the different kinds of composition, see *ST* I, q. 3, aa. 1-6, vol. 4, pp. 35-49.

[49] St. Thomas seems to make essentially the same point in the *De potentia*, q. 3 a. 1 *ad* 16*um*, vol. 2, p. 41 and in the *DPN*, ch. 2, vol. 43, p. 40. In the former he writes: "dicendum quod si ly ex nominet causam, non fit aliquid ex opposito nisi per accidens, ratione scilicet subjecti. Si vero nominet ordinem, tunc fit aliquid ex opposito etiam per se; unde et privatio dicitur principium esse fiendi, sed non essendi..." In the latter St. Thomas says: "Sed duplex est accidens, scilicet necessarium quod non separatur a re, ut risibile hominis, et non necessarium quod separatur, ut album ab homine. Unde licet privatio sit principium per accidens, non sequitur quod non sit necessarium ad generationem, quia materia a privatione non denudatur; in quantum enim est sub una forma, habet privationem alterius et e converso, sicut in igne est privatio aeris et in aere privatio ignis."

privation is a "*per accidens* principle and cause" of the becoming whereby what comes to be comes to be.

If we now collect together what we have established in this first part of this chapter, it should be clear that we have indeed arrived at a most general understanding of the principles of nature. For we have manifested the fact that matter, form, and privation are found in every becoming. Also, we have showed that these same three things are veritable principles of every becoming. Lastly, we have noted that these three principles of every becoming can either be considered as two opposite principles and one material principle, or as two *per se* principles and one *per accidens* principle.

## Part II

Now that we have answered the question, "What are the principles of becoming?," it is appropriate for us to take up the more specific question, namely, "What are the principles of substantial becoming?" It should be noted, though, that since every substantial becoming is a becoming, we have already answered this more specific question in a general way. That is, in response to the question, "What are the principles of substantial becoming," one might truthfully answer, "matter, form, and privation." However, such an answer would not fully satisfy us, for when we ask this question, we desire to know the natures of the matter, form, and privation which are specific to substantial becoming. In other words, in asking the question, "What are the principles of substantial becoming?," we are inquiring into what the natures of the principles which are proper to substantial becoming in fact are and, in so doing, we are attempting to see how these principles differ from the principles proper to accidental becoming. Hence, in order to answer this question adequately, in this part of this chapter we shall attempt to manifest both the natures of the matter,

form, and privation proper to substantial becoming and the ways in which these same principles are both similar to and different from the principles proper to accidental becoming.

## 1. The Nature of the Matter in Substantial Becoming

Let us begin, then, with an inquiry into the nature of the matter in substantial becoming. So far all we have truly established about this matter is that it is not a substance and that this fact is in accord with what we know from our common experience. How can we go farther than this in our attempt to understand the nature of this matter? Aristotle and St. Thomas tell us that the only way to do this is by using a proportion or analogy.[50] Regarding this Aristotle says:

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[50] This is one of the two ways of knowing matter which St. Thomas refers to in *In de Trin.*, q. 4, a. 2, vol. 50, p. 123. He writes: "Sciendum est ergo quod diversitas secundum genus reducitur in diversitatem materiae, diversitas vero secundum speciem in diversitatem formae, sed diversitas secundum numerum partim in diversitatem materiae, partim in diversitatem accidentis. Cum autem genus sit principium cognoscendi, utpote prima definitionis pars, materia autem secundum se sit ignota, non potest secundum se ex ea accipi diversitas generis, sed solum illo modo, quo cognoscibilis est. Est autem cognoscibilis dupliciter. Uno modo per analogiam sive per proportionem, ut dicitur in I physicorum. Hoc est, ut dicamus illud esse materiam quod hoc modo se habet ad res naturales sicut lignum ad lectum. Alio modo cognoscitur per formam, per quam habet esse in actu. Unumquodque enim cognoscitur, secundum quod est in actu, et non secundum quod est in potentia, ut dicitur in IX metaphysicae."

Following Fr. Joseph Owens's lead, it is worth noting that what is meant here by "knowable according to proportion or analogy" is different from the understanding of analogy which would enable us to arrive at a merely probable conclusion. Regarding this, Fr. Owens writes: "No tincture of probability weakens this reasoning of Aristotle in the overall procedure of *Physics* I. How, then, does the reluctance to accept it as apodictical arise? Already in ancient times, on the topic of word formation, Quintilian (I 6, 12-16) had noted that analogy could not be everywhere applied, that it was based not upon reasoning but upon example, and that it was not a law of speech but the result of custom. Where it did apply, however, he regarded it as a means of using what was certain to probe what was uncertain. With Quintilian as his background for the notion, Butler, in his widely read treatise *The Analogy of Religion* presented analogy as a means of probably reasoning, in contrast to strict demonstration. Zoology, biology, psychology, and linguistics joined in this acceptation of the term. Accordingly analogy became catalogued in logic as a merely probable argument by which "we conclude because A resembles B in one or more properties, that it does so in a certain other property." Need one be surprised, therefore, that this commonly accepted modern notion of analogy throws such a smoke screen over the Aristotelian argument in *Physics* I?

"In Aristotle's own language, in fact, it is hard to see how this currently accepted notion of analogy, if proposed as a demonstration, would not come under the fallacy of accident. It reasons from one accidentally connected predicate to something else that is accidentally connected: "It is, however, not always true, e.g. suppose that *A* and *B* are 'the same' as *C per accidens*; for both 'snow' and the 'swan' are the same as something 'white'" (*Soph. El.* 6, 168 b 33-35). The sameness in which snow and swan coincide here is merely accidental. The notion in which artificial change and change within substance coincide in the argument of the *Physics*, however, is required by the nature of change wherever it occurs. It is not something accidental to the various instances of change. It is essential to each of them. If it were lacking, the instance would no longer be one of change." See his, "The

> The underlying nature, however, is scientifically knowable according to proportion {analogy}. For as bronze is to statue or as timber is to bed or as material and the formless before it takes on form is to whatever else has form, so is this underlying nature to substance and "this something" and a being.[51]

Commenting on this text, the Angelic Doctor teaches:

> And he [i.e., Aristotle] says that the nature which is first subject to change, that is first matter, cannot be known through itself, since everything that is known is known through its form, but first matter is considered as the subject of every form. However, it is known according to analogy, that is according to proportion. For we know that wood is something other than the form of a bench or bed, since sometimes it is under one form, and sometimes it is under another form. Since, therefore, we see that what is air sometimes becomes water, it is necessary to say that something existing under the form of air sometimes is under the form of water. And, thus, this is something other than the form of water and other than the form of air, just as wood is something other than the form of the bench and other than the form of the bed. Thus, that which stands to natural substances themselves as bronze stands to statue and wood to bed and everything material and unformed to form, we call "first matter."
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> This, therefore, is one principle of nature which is not one as a "this something," that is, as some individual that can be demonstrated [to sense], such that it has form and unity is act. Rather, it is called being and one insofar as it is in potency to form.[52]

These texts show us that if we start with a proportion such as, bronze : statue :: matter : substance, then at least four truths become clear regarding the nature of the matter in substantial becoming.

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Aristotelian Argument for the Material Principle of Bodies," in *Aristotle: The Collected Papers of Joseph Owens*, p. 126.

[51] *Physics*, Bk. 1, ch. 7, 191a8-11.

[52] Et dicit quod natura quae primo subiicitur mutationi, idest materia prima, non potest sciri per seipsam, cum omne quod cognoscitur, cognoscatur per suam formam; materia autem prima consideratur subiecta omni formae. Sed scitur *secundum analogiam*, idest secundum proportionem. Sic enim cognoscimus quod lignum est aliquid praeter formam scamni et lecti, quia quandoque est sub una forma, quandoque sub alia. Cum igitur videamus hoc quod est aer quandoque fieri aquam, oportet dicere quod aliquid existens sub forma aeris, quandoque sit sub forma aquae: et sic illud est aliquid praeter formam aquae et praeter formam aeris, sicut lignum est aliquid praeter formam scamni et praeter formam lecti. Quod igitur sic se habet ad ipsas substantias naturales, sicut se habet aes ad statuam et lignum ad lectum, et quodlibet materiale et informe ad formam, hoc dicimus esse materiam primam. Hoc igitur est unum principium naturae: quod non sic unum est *sicut hoc aliquid*, hoc est sicut aliquod individuum demonstratum, ita quod habeat formam et unitatem in actu; sed dicitur ens et unum inquantum est in potentia ad formam. *In Phys.*, Bk., 1, *lectio* 13, vol. 2, p. 46. See also *In Metaphys.*, Bk. 7, *lectio* 2, pp. 384-385 (#s1285-1290) as well as Bk. 8, *lectio* 1 pp. 488-489 (#s1688-1689).

First, we can readily see that just as bronze is what becomes a statue, so too matter is what becomes a substance. Second, just as the bronze is something other than the form of a statue (which is evident from the fact that the bronze can either have or not have the form of a statue), so too matter is something other than the form of a substance.[53] Third, just as the bronze is what is able to receive the form of a statue (which is manifest from the fact that the bronze actually receives such a form), so too matter is what is able to receive the form of a substance. And fourth, to put the third point slightly differently,[54] just as the bronze is what is able to be actualized by the form of a statue (which we see from the fact that the bronze actually is a statue once it has received the form of a statue), so too matter is what is able to be actualized by the form of a substance.[55]

But this fourth point raises an important question. For when we say that the bronze is what is able to be actualized by the form of a statue, we see that there is a distinction between the bronze and its ability to be actualized by the said form. Indeed, the bronze stands to its ability to be actualized as substance to accident. Or, we might say, the bronze has or possesses, as something

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[53] Perhaps it is worthwhile to point out that through this proportion we can also see that the bronze is something other than the privation of the form of a statue. This is clear from the fact that once the bronze receives the form of a statue, it no longer lacks that form. Hence, so too matter is distinct from whatever privation is opposed to the form of the substance which it receives. Speaking about this universally, St. Thomas says: "Oportet enim subiectum mutationis et motus alterum esse, per se loquendo, ab utroque terminorum motus, ut probatum est primo physicorum. Unde, cum materia sit primum subiectum substans non solum motibus, qui sunt secundum qualitatem et quantitatem et alia accidentia, sed etiam mutationibus quae sunt secundum substantiam, oportet, quod materia sit alia secundum sui essentiam ab omnibus formis substantialibus et earum privationibus, quae sunt termini generationis et corruptionis; et non solum quod sit aliud a quantitate et qualitate et aliis accidentibus." *In Metaphys.*, Bk. 7, *lectio* 2, p. 384 (#1286).

[54] In his *Quaestiones quodlibetales*, St. Thomas says, "actus autem participatus a materia nihil est aliud quam forma; unde idem est dictu, materiam esse in actu, et materiam habere formam" *Quod.* III, q. 1, a. 1, vol. 25, 2, p. 242.

[55] The ability that we are attributing to the material principles in both accidental and substantial becoming is one that is passive in nature. Passive ability is opposed to active ability. The former is the ability to be or to be acted on whereas the latter is the ability to do or to act on another. We should also note that throughout this essay we shall prefer the name "ability" to the term "potency." On this point, see *De potentia*, q. 1, a. 1, vol. 2, pp. 8-9.

super-added to its nature, so to speak, an ability to be formed as a statue. Is there this same distinction, then, between the matter in substantial becoming and its ability to be actualized by the form of a substance? Is it true to say that this matter has or possesses, as something super-added to its nature, an ability to be formed as a substance? In response to this question St. Thomas states:

> ...just as potency to quality is not something outside of the genus of quality, so too potency to substantial existence is not something outside of the genus of substance. Therefore, the potency of matter is not some property super-added to its essence. Rather, matter according to its very essence is potency to substantial existence [*materia secundum suam essentiam est potentia ad esse substantiale*]. Nevertheless, the potency of matter is one in subject with respect to many forms, but in account there are many potencies according to the relation to diverse forms. Whence, in the third book of this work [i.e., *Physics*] it is said that the ability to be healthy and the ability to be sick differ according to account.[56]

And in his *In de Sent.*, St. Thomas gives essentially the same answer to this question. He writes:

> If by "passive potency" one understands a relation or order of matter to form, then matter is not its own potency, because the essence of matter is not a relation. If, however, potency is understood insofar as it is a principle in the genus of substance, then, insofar as potency and act are principles in every genus, as is said in Book Twelve of the *Metaphysics*, I say that matter is its very own potency. And in this way, first matter, which is the first receiver, stands to passive potency, just as God, who is the first agent, stands to active potency. And, therefore, matter is its own passive potency, just as God is His own active potency. But all intermediate things have each potency by participation, and the potency of matter is not ordered to some operation, but only to reception.[57]

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[56] ...sicut potentia ad qualitatem non est aliquid extra genus qualitatis, ita potentia ad esse substantiale non est aliquid extra genus substantiae. Non igitur potentia materiae est aliqua proprietas addita super essentiam eius; sed materia secundum suam substantiam est potentia ad esse substantiale. Et tamen potentia materiae subiecto est una respectu multarum formarum; sed ratione sunt multae potentiae secundum habitudinem ad diversas formas. Unde in tertio huius dicetur quod posse sanari et posse infirmari differunt secundum rationem. *In Phys.* Bk. 1, *lectio* 15, vol. 2, p. 52.

[57] ...si per potentiam passivam intelligatur relatio vel ordo materiae ad formam, tunc materia non est sua potentia, quia essentia materiae non est relatio. Si autem intelligatur potentia, secundum quod est principium in genere substantiae, secundum quod potentia et actus sunt principia in quolibet genere, ut dicitur, in 12 Metaph., sic dico, quod materia est ipsa sua potentia. Et hoc modo se habet materia prima, quae est primum recipiens, ad potentiam passivam, sicut se habet Deus, qui est primum agens, ad potentiam activam. Et ideo materia est sua potentia passiva, sicut et Deus sua potentia activa. Omnia autem media habent utramque potentiam participative, et potentia materiae non est ad aliquam operationem, sed ad recipiendum tantum. *In Sent.* Bk. 1, d. 3, q. 4, a. 2 *ad*

From these texts it is clear that St. Thomas thinks that there is no distinction between the nature of the matter in substantial becoming and its ability to receive or be actualized by the form of a substance. Rather, he maintains that the nature of this material principle is nothing other than pure passive ability. Or, to use his words, *secundum suam essentiam est potentia ad esse substantiale.* Now although St. Thomas does not give an explicit argument for this position in either of the texts cited above, it seems possible to defend this position by showing the impossibility of the contradictory. For example, one might state that if there were a distinction between matter's ability and its nature, such that the matter in question were to have or possess its ability to be actualized by the form of a substance as the bronze has or possesses its ability to be shaped, then the matter in substantial becoming would stand to its ability as a substance stands to its accident (for this is how bronze stands to its ability to be shaped). But, then, the matter in substantial becoming would be a substance having various accidents, which we have already shown to be false.[58] Thus, there is no distinction between the matter in substantial becoming and its ability to be actualized by the form of a substance.

## 2. Some Properties of First Matter

Having seen, then, that the matter in substantial becoming is nothing other than pure passive ability or *secundum suam essentiam est potentia ad esse substantiale*, we can now make clear why

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4*um*, vol. 1, p. 117. See also, *ST* I, q. 77, a. 1 *ad* 2*um*, vol. 5, p. 237

[58] Here we are assuming that whatever is the subject of accidents is a substance. In other words, we are assuming that it is impossible for the matter in substantial becoming to be what immediately underlies some accident(s). We shall give an argument for this below when we show that there can be no accident in between the matter in substantial becoming and what we are here calling "the form of a substance."

this matter is fittingly named "first matter." We observed before that there are only two kinds of becoming (i.e., accidental and substantial) because there are only two sorts of existence, namely accidental existence and substantial existence. But from this same fact, namely that there are only two sorts of existence, we can also see that there are only two kinds of matters, namely substance and the matter in substantial becoming. For substance is what is able to have accidental existence (or what is able to be in a certain respect) through the reception of a certain kind of form, while the matter in substantial becoming is what is able to have substantial existence (or to be simply speaking) through the reception of a different kind of form.[59] Now since there is no sort of existence which is more fundamental than substantial existence, there is likewise no kind of matter which is more fundamental than the matter in substantial becoming. Hence, we can say that the matter in substantial becoming has no matter before it and, therefore, is fittingly named "first matter." Speaking to this point, St. Thomas says that "the very matter which is understood without any form and privation, but [which is] subject to form and privation, is called 'first matter,' because there is no other matter before it."[60]

Furthermore, insofar as it is *first* matter, the matter in substantial becoming must be the matter

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[59] Related to this point, St. Thomas has the following to say at the beginning of his *DPN*, vol. 43, p. 39: "Nota quod quoddam potest esse licet non sit, quoddam vero est. Illud quod potest esse dicitur esse potentia; illud quod iam est, dicitur esse actu. Sed duplex est esse: scilicet esse essentiale rei, sive substantiale ut hominem esse, et hoc est esse simpliciter. Est autem aliud esse accidentale, ut hominem esse album, et hoc est esse aliquid. Ad utrumque esse est aliquid in potentia. Aliquid enim est in potentia ut sit homo, ut sperma et sanguis menstruus; aliquid est in potentia ut sit album, ut homo. Tam illud quod est in potentia ad esse substantiale, quam illud quod est in potentia ad esse accidentale, potest dici materia, sicut sperma hominis, et homo albedinis. Sed in hoc differt: quia materia quae est in potentia ad esse substantiale, dicitur materia ex qua; quae autem est in potentia ad esse accidentale, dicitur materia in qua."

[60] "Ipsa...materia que intelligitur sine qualibet forma et privatione, sed subiecta forme et privationi, dicitur materia prima, propter hoc quod ante ipsam non est alia materia." *DPN*, ch. 2, vol. 43, p. 41. When we say that first matter is "first," we only mean that there is nothing before it in its genus or in a certain order. Of course, since God is first simply speaking, He is before first matter.

in which all other posterior matters in some way share or participate. Regarding this, St. Thomas writes:

> ...*hyle*, or first matter, is the most proper subject receptive of generation and corruption. For...it immediately stands under substantial forms which, through generation and corruption, come and go. But in some way, namely consequently and mediately, it underlies all other changes. For all subjects of other changes are receptive of other contrarieties which are reduced to the first contrariety, that of form and privation, whose subject is first matter, as is said in Book One of the *Physics*. Thus, all other subjects participate in some way in first matter insofar as they are composed of matter and form.[61]

Here St. Thomas makes it clear that while first matter underlies substantial becoming (and the forms of substances) immediately, it also underlies accidental becoming (and accidents) "consequently and mediately." For the immediate matter in accidental becoming (as well as the immediate matter of accidents) is substance, which, in turn, is composed of first matter and the form of a substance.[62]

Now above St. Thomas mentioned in passing that "the potency of matter is one in subject with respect to many forms, but in account there are many potencies according to the relation to diverse forms." And he manifested this by bringing up the example of the ability to be healthy and the ability to be sick. That is, these two abilities are one in subject (e.g., one and the same man, Mr. Smith, is able to be healthy and able to be sick), but they are many in account (for the account of health differs

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[61] ...*hyle*, sive materia prima, est maxime proprium subiectum susceptibile generationis et corruptionis: quia, sicut dictum est, immediate substat formis substantialibus, quae per generationem et corruptionem adveniunt et recedunt. Sed quodammodo, scilicet ex consequenti et mediate, subiicitur omnibus aliis transmutationibus: quia omnia subiecta aliarum transmutationum sunt susceptibilia aliquarum contrarietatum, quae reducuntur in primam contrarietatem, quae est formae et privationis, cuius subiectum est prima materia, ut dicitur in I Physic. Et ideo omnia alia subiecta participant quodammodo materiam primam, inquantum ex materia et forma componuntur. *In de Gen.*, Bk. 1, *lectio* 10, vol. 3, p. 301. On this same point, see also *In Sent.*, Bk. 2, d. 12, q. 1, a. 1 *ad 5um*, vol. 2, p. 304.

[62] One might further illustrate the universal causality of first matter through the following sort of analogy: as letters are to syllables, and syllables to words, and words to sentences, so too is first matter to the elements, and the elements to mixed bodies, and mixed bodies to living bodies. We shall return to this consideration below.

from the account of sickness).[63] Hence, St. Thomas is saying that the ability to receive the forms of substances which is first matter is one in subject (i.e., it is the same pure passive ability which receives this form now and that form latter), but many in account (insofar as this ability is considered to be the ability for this form or the ability for that form).

But this raises an important question. Is first matter more inclined to receive the forms of some substances than of others? St. Thomas addresses this question in various texts. One of his most complete accounts, though, seems to be the following text from the *SCG*. He writes:

> Now since, as was said, everything which is subject to motion, insofar as it is in motion, tends to divine likeness in order that it may be perfect in itself. But each thing is perfect insofar as it comes to be in act. [Whence], it is necessary that the intention of each thing existing in potency be that it aims at act. Therefore, insofar as some act is posterior and more perfect, to that extent the appetite of matter is more principally directed to it. Hence, it is necessary that the appetite of matter, by which it desires form, tend to the last and most perfect act which the matter is able to acquire as to the last end of generation. But in the acts of forms, certain levels are found. For first matter is first in potency to the form of an element. But existing under the form of an element, it is in potency to the form of a mixed body, on account of which elements are the matter of a mixed body. But under the form of a mixed body, it is in potency to the vegetative soul, for the soul is the act of such a body. Furthermore, the vegetative soul is in potency to the sensitive soul and the sensitive soul to the intellectual soul. Indeed, the process of generation shows this. For, in generation, the fetus first lives by the life of a plant, but afterwards by the life of an animal, and lastly by the life of a man. But in generable and corruptible things, no posterior and more honorable form is found after this form. The last end, therefore, of the whole of generation is the human soul, and to this matter tends as to a last form. The elements, therefore, are for the sake of mixed bodies which, in turn, are for the sake of living things. But amongst living things, plants are for the sake of animals and animals for

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[63] See also, *In Phys.* Bk. 3, *lectio* 2, vol. 2, p. 106. There St. Thomas says, "Manifestum est enim quod aliquod idem subiectum est in potentia ad contraria, sicut humor aut sanguis est idem subiectum se habens in potentia ad sanitatem et aegritudinem. Manifestum est autem quod esse in potentia ad sanitatem, et esse in potentia ad aegritudinem, est alterum et alterum (et hoc dico secundum ordinem ad obiecta): alioquin si idem esset posse laborare et posse sanari, sequeretur quod laborare et sanari essent idem. Differunt ergo posse laborare et posse sanari secundum rationem, sed subiectum est unum et idem."

the sake of man. Thus, man is the end of the whole of generation.[64]

In this text St. Thomas resolves the question raised above by looking to the desire of first matter.[65] For, since the form of a substance stands to first matter as an end stands to that which desires the end,

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[64] Cum vero, ut dictum est, quaelibet res mota, inquantum movetur, tendat in divinam similitudinem ut sit in se perfecta; perfectum autem sit unumquodque inquantum fit actu: oportet quod intentio cuiuslibet in potentia existentis sit ut per motum tendat in actum. Quanto igitur aliquis actus est posterior et magis perfectus, tanto principalius in ipsum appetitus materiae fertur. Unde oportet quod in ultimum et perfectissimum actum quem materia consequi potest, tendat appetitus materiae quo appetit formam, sicut in ultimum finem generationis. In actibus autem formarum gradus quidam inveniuntur. Nam materia prima est in potentia primo ad formam elementi. Sub forma vero elementi existens est in potentia ad formam mixti: propter quod elementa sunt materia mixti. Sub forma autem mixti considerata, est in potentia ad animam vegetabilem: nam talis corporis anima actus est. Itemque anima vegetabilis est potentia ad sensitivam; sensitiva vero ad intellectivam. Quod processus generationis ostendit: primo enim in generatione est fetus vivens vita plantae, postmodum vero vita animalis, demum vero vita hominis. Post hanc autem formam non invenitur in generabilibus et corruptibilibus posterior forma et dignior. Ultimus igitur finis generationis totius est anima humana, et in hanc tendit materia sicut in ultimam formam. Sunt ergo elementa propter corpora mixta; haec vero propter viventia; in quibus plantae sunt propter animalia; animalia vero propter hominem. Homo igitur est finis totius generationis. *SCG*, Bk. 3, ch. 22, vol. 14, p. 53. Similarly, in *In Metaphys.*, Bk. 12, *lectio* 2, p. 688 (#2438), St. Thomas writes: "Quamvis...generatio fiat ex non ente quod est in potentia, non tamen fit quodlibet ex quocumque; sed diversa fiunt ex diversis materiis. Unumquodque enim generabilium habet materiam determinatam ex qua fit, quia formam oportet esse proportionatam materiae. Licet enim materia prima sit in potentia ad omnes formas, tamen quodam ordine suscipit eas. Per prius enim est in potentia ad formas elementares, et eis mediantibus secundum diversas proportiones commixtionum est in potentia ad diversas formas: unde non potest ex quolibet immediate fieri quodlibet, nisi forte per resolutionem in primam materiam."

[65] One might wonder whether it is proper to speak of "desire" belonging to first matter. Regarding this, St. Thomas says: "Sciendum est enim quod omne quod appetit aliquid, vel cognoscit ipsum et se ordinat in illud; vel tendit in ipsum ex ordinatione et directione alicuius cognoscentis, sicut sagitta tendit in determinatum signum ex directione et ordinatione sagittantis. Nihil est igitur aliud appetitus naturalis quam ordinatio aliquorum secundum propriam naturam in suum finem. Non solum autem aliquid ens in actu per virtutem activam ordinatur in suum finem, sed etiam materia secundum quod est in potentia; nam forma est finis materiae. Nihil igitur est aliud materiam appetere formam, quam eam ordinari ad formam ut potentia ad actum. Et quia sub quacumque forma sit, adhuc remanet in potentia ad aliam formam, inest ei semper appetitus formae: non propter fastidium formae quam habet, nec propter hoc quod quaerat contraria esse simul; sed quia est in potentia ad alias formas, dum unam habet in actu." *In Phys.*, Bk. 1, *lectio* 15, vol. 2, pp. 53-54. Also, in *DPN*, ch. 3, vol. 43, p. 42, St. Thomas writes: "Et sciendum, quod omne agens tam naturale quam voluntarium intendit finem, non tamen sequitur quod omne agens cognoscat finem, vel deliberet de fine. Cognoscere enim finem est necessarium in his quorum actiones non sunt determinatae, sed se habent ad opposita, sicut se habent agentia voluntaria; et ideo oportet quod cognoscant finem per quem suas actiones determinent. Sed in agentibus naturalibus sunt actiones determinatae: unde non est necessarium eligere ea quae sunt ad finem. Et ponit exemplum Avicenna de citharaedo quem non oportet de qualibet percussione chordarum deliberare, cum percussiones sint determinatae apud ipsum; alioquin esset inter percussiones mora, quod esset absonum. Magis autem videtur de operante voluntarie quod deliberet, quam de agente naturali. Et ita patet per locum a maiori, quod possibile est agens naturale sine deliberatione intendere finem: et hoc intendere nihil aliud erat quam habere naturalem inclinationem ad aliquid."

we must hold that "insofar as some act is posterior and more perfect, to that extent the appetite of matter is more principally directed to it." It follows, then, that first matter desires the forms of plants more than the forms of inanimate substances, and the forms of animals more than the forms of plants. For the forms of animals are more perfect than those of plants, and these in turn are more perfect than the forms of inanimate substances.[66]

Furthermore, given the principle just mentioned, "it is necessary that the appetite of matter, by which it desires form, tend to the last and most perfect act which the matter is able to acquire as to the last end of generation." But "the last and most perfect act" which first matter is able to acquire is none other than the form of man. For this form is more perfect than that of any other form of a substance here below. Hence, we must hold that in some way first matter desires the form of man more than the form of any other substance.[67] Indeed, it is precisely because the form of man is "the last and most perfect act" that it is also "the last end of generation."

As a result, it is clear that first matter is more inclined to receive the forms of some substances

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[66] The reason for this will be made clear in chapter seven.

[67] Nonetheless, we should not think that first matter's ability to receive the forms of other substances is somehow removed when it is under the form of man. For if this were the case, then every man would perforce be immortal. On this point, St. Thomas says: "...cum materia prima secundum se considerata sit in potentia ad omnes formas naturales, non poterit tota ejus potentia terminari nisi per adeptionem omnium formarum. Non enim una forma recepta in materia (etiam si sit nobilior et magis perfecta) tollit potentiam ad formam aliam minus nobilem; materia enim sub forma ignis existens, adhuc remanet in potentia ad formam terrae." *In Sent.*, Bk. 2, d. 12, q. 1, a. 1, vol. 2, p. 302. Also, in *In Sent.*, Bk. 4, d. 44, q. 2, a. 1, qc. 1 *ad 2um*, quoted from *Supplementum tertiae partis*, vol. 12, p. 188, he writes: "...duplex est potentia: ligata, et libera; et hoc non solum est verum de potentia activa, sed etiam passiva. Forma enim ligat potentiam materiae, determinando ipsam ad unum, secundum quod dominatur super eam. Et quia in rebus corruptibilibus non perfecte dominatur forma super materiam, non perfecte potest ligare ipsam, quin recipiat interdum per aliquam passionem dispositionem contrariam formae. Sed in sanctis post resurrectionem omnino anima dominabitur supra corpus; nec illud dominium aliquo modo poterit auferri, quia ipsa erit immutabiliter Deo subjecta, quod non fuit in statu innocentiae; et ideo in corporibus illis manet eadem potentia ad formam aliam quae nunc inest, quantum ad substantiam potentiae; sed erit ligata per victoriam animae supra corpus, ut nunquam in actum passionis exire possit." See also, *ST* I, q. 45, a. 5 *ad 2um*, vol. 4, p. 470.

than of others.[68] For first matter is more inclined to receive the forms of substances which are more perfect and most of all inclined to receive the form of man. Hence, even if these more perfect forms are after the less perfect forms (or last of all, in the case of the form of man), in the order of acquisition, nonetheless, these same forms are before the less perfect ones (or first, in the case of the form of man) in the order of the natural desire or inclination of first matter.[69]

Another property which belongs to first matter is that it is both ingenerable and incorruptible *per se*. In other words, first matter as such can neither come to be nor cease to be. Showing this to be the case, St. Thomas states:

> He [i.e., Aristotle] says that [first matter] is in a way corrupted, and in a way not corrupted. For, insofar as privation is in it, it is corrupted when the privation ceases to be in it, as if we were to say that the unshaped bronze is corrupted when it ceases to be unshaped. According to itself, however, insofar as it is a certain being in potency, it is ingenerable and incorruptible. This is clear from the following. For, if matter were to come to be, then there would have to be some subject from which it would come to be, as is clear from what was said above. But the first thing which underlies in generation is matter, for we give the name "matter" to the first subject from which something comes to be *per se*, and not accidentally, and which is in the thing made (and each of these is posited to differentiate matter from privation, from

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[68] Here we are by no means denying the teaching of St. Thomas that, conceived of as stripped of all forms, first matter is no more in potency to one form than to another. Regarding this, the Angelic Doctor writes: "materia prout nuda consideratur, se habet indifferenter ad omnes formas; sed determinatur ad speciales formas per virtutem moventis, ut traditur in II de generatione. Et secundum ordinem intelligibilem formarum in materia, est ordo agentium naturalium. Inter ipsa enim corpora caelestia unum est universalius activum quam alterum; nec universalius agens agit seorsum ab inferioribus agentibus, sed ultimum agens proprium agit in virtute omnium superiorum. Unde non imprimuntur a diversis agentibus diversae formae in uno individuo, sed una forma est quae imprimitur a proximo agente, continens in se virtute omnes formas praecedentes; et materia, secundum quod consideratur perfecta sub ratione formae universalioris et accidentium consequentium, fit propria ad subsequentem perfectionem." *De spir. creat.*, a. 3 *ad* 20*um*.

[69] It is worth noting the likeness between the desire for form which belongs to first matter and the desire for form which belongs to the understanding. For example, similar to what was just described with first matter, every man naturally desires to know the higher sciences more so than the lower ones. It is better to know solid geometry than to know plane geometry, and it is better to know metaphysics than to know natural philosophy. While the latter sciences are before the former, in the order of acquisition, the former are before the latter, in the order of the natural desire or inclination of the understanding. One profound difference, though, is that while the understanding can underlie many forms in act simultaneously (i.e., *in habitu*), first matter can only underlie one form of a substance at a time. This will be shown to be the case below. See, *De anima*, a. 18 *ad* 5*um*.

> which something comes to be *per accidens* and which is not in the thing made). It follows, therefore, that matter would be before it comes to be, which is impossible. And, similarly, everything which is corrupted is resolved into first matter. When, therefore, first matter is, [something] has corrupted. Thus, if first matter were corrupted, it will be corrupted before it is corrupted, which is impossible. Hence, it is impossible for first matter to be generated or corrupted. This is not to deny, nevertheless, that it was produced through creation.[70]

From this argument we see that to attribute coming to be *per se* or ceasing to be *per se* to first matter is to imply that first matter has some matter before it. For, if first matter were to come to be *per se*, then it would come to be from some more fundamental matter since in every becoming there is some matter which becomes. This, however, is impossible. Likewise, if first matter were to cease to be *per se*, then it would be resolved into some more fundamental matter since in every ceasing to be there is some matter into which what ceases to be is resolved. But this too is impossible. Hence, we see that first matter can neither come to be *per se* nor cease to be *per se*. Nevertheless, as St. Thomas points out, to maintain this is not to deny either that first matter comes to be and ceases to be *per*

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[70] Et dicit quod quodammodo corrumpitur, et quodammodo non. Quia secundum quod est in ea privatio, sic corrumpitur cum cessat in ea esse privatio, ut si diceremus aes infiguratum corrumpi, quando desinit esse infiguratum: sed secundum se, inquantum est quoddam ens in potentia, est ingenita et incorruptibilis. Quod sic patet. Si enim materia fiat, oportet ei aliquid subiici ex quo fiat, ut ex superioribus patet. Sed primum quod subiicitur in generatione est materia: hoc enim dicimus materiam, primum subiectum ex quo aliquid fit per se et non secundum accidens, et inest rei iam factae (et utrumque eorum ponitur ad differentiam privationis, ex qua fit aliquid per accidens, et non inest rei factae). Sequitur ergo quod materia sit antequam fiat, quod est impossibile. Et similiter omne quod corrumpitur, resolvitur in materiam primam. Quando igitur iam est materia prima, tunc est corruptum: et sic, si materia prima corrumpatur, erit corrupta antequam corrumpatur, quod est impossibile. Sic igitur impossibile est materiam primam generari vel corrumpi. Sed ex hoc non excluditur quin per creationem in esse procedat. *In Phys*, Bk. 1, *lectio* 15, vol. 2, p. 54. Regarding the definition of "first matter" given here, see *Cursus Philosophicus, Nat. Phil.*, p. 1, q. 3, a. 1, p. 58 as well as Fr. William Wallace, O.P., *The Elements of Philosophy* (Staten Island, NY: Alba House, 1977), p. 43. It is worth noting that John of St. Thomas does not have the term "per se" in his version of the definition and Fr. Wallace translates the "per se" as "without qualification."

St. Thomas also argues for the conclusion that both matter and form are ingenerable and incorruptible. Consider the following text: "Et sciendum quod materia prima, et etiam forma, non generatur neque corrumpitur, quia omnis generatio est ad aliquid ex aliquo. Id autem ex quo est generatio, est materia; id ad quod est forma. Si igitur materia vel forma generaretur, materiae esset materia, et formae forma, in infinitum. Unde generatio non est nisi compositi, proprie loquendo." *DPN*, ch. 2, vol. 43, p. 41.

*accidens* or that first matter is created by God.

Lastly, it is worth noting that first matter is one in number in all natural substances which change into one another. Regarding this, St. Thomas writes:

> It must be known that first matter is called one in number in all things. But one in number is said in two ways, namely, when something has one determinate form in number, as Socrates, and in this way first matter is not called one in number since in itself it does not have a form. Also, something is said to be one in number because it is without the dispositions which make [things] to differ according to number, and in this way first matter is one in number because it is understood without all of the dispositions by which there is difference in number.[71]

This is to affirm, for example, that the first matter in Mr. Smith and the first matter in the steak on his plate are one in number. In saying this, we are not maintaining that there is not a distinction between the first matter in Mr. Smith and the first matter in his steak precisely insofar as these are essential parts of their respective substances. Rather, we are maintaining that when these first matters are considered apart from the forms of their respective substances, there is nothing left, so to speak, whereby they can be distinguished either specifically or numerically. That is, when we consider these first matters apart from the said forms, there is nothing left to consider except pure passive ability (which is "without the dispositions which make [things] to differ according to number"). Hence, considered in this way, it is true to state that the first matter in Mr. Smith and the first matter in the steak on this plate are one in number. Indeed, the same must be said regarding the first matter which

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[71] Sciendum est etiam, quod materia prima dicitur una numero in omnibus. Sed unum numero dicitur duobus modis: scilicet quod habet unam formam determinatam in numero, sicut Socrates: et hoc modo materia prima non dicitur unum numero, cum in se non habeat aliquam formam. Dicitur etiam aliquid unum numero, quia est sine dispositionibus quae faciunt differre secundum numerum: et hoc modo dicitur materia prima unum numero, quia intelligitur sine omnibus dispositionibus a quibus est differentia in numero. *DPN*, ch. 3, vol. 43, p. 41.

is present in all natural substances which are able to change into one another.[72]

### 3. Substantial Form and Accidental Form

Having examined, then, the nature of first matter in substantial becoming, let us now turn to a consideration of the nature of the principle of substantial becoming named "form." As of yet we have not formally distinguished the principle of substantial becoming named "form" from the principle of accidental becoming named "form." St. Thomas aids us in doing this in the first chapter of *DPN*. There he writes:

> But just as everything that is in potency can be called "matter," so everything from which something has existence, whatever existence it be, whether substantial or accidental, can be called "form." Thus, when a man is white in potency, he becomes white in act through whiteness, and a sperm, when it is a man in potency, becomes a man in act through the soul. And because form makes [something] to be in act, therefore, form is said to be "act." But that which makes substantial existence to be in act is "substantial form," and what makes accidental existence in act is called "accidental form."[73]

Here we see that the principle of accidental becoming named "form" is distinguished from the principle of substantial becoming named "form" insofar as the former, now called "accidental form," is that by which a substance is accidentally or in a certain respect, whereas the latter, now called

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[72] The question of whether there is in fact only one first matter for all natural substances need not be resolved here. St. Thomas seems to think that it is perfectly intelligible to speak of different first matters which would be differentiated insofar as they are pure passive abilities for different forms of substances. See, for example, *ST* I, q. 66, a. 2, vol. 5, pp. 156-157 . Finally, this question must be resolved through seeing which natural substances can change into one another, as St. Thomas suggests in the article just cited.

[73] Sicut autem omne quod est in potentia potest dici materia, ita omne a quo aliquid habet esse, quodcumque esse sit sive substantiale, sive accidentale, potest dici forma; sicut homo cum sit potentia albus, fit actu albus, per albedinem et sperma, cum sit potentia homo, fit actu homo per animam. Et quia forma facit esse in actu, ideo forma dicitur esse actus. Quod autem facit actu esse substantiale, est forma substantialis, et quod facit actu esse accidentale, dicitur forma accidentalis. *DPN*, ch. 1, vol. 43, p. 39.

"substantial form," is that by which a substance is a substance or is simply speaking. Or, to put it slightly differently, the act called "accidental form" gives to its matter accidental existence and thereby makes it to be in a certain respect, while the act called "substantial form" gives to its matter substantial existence and thereby makes it to be simply speaking.

In a text from the *Prima pars* of the *ST*, St. Thomas speaks of both the similarities and the differences between accidental form and substantial form more completely. There he states:

> ...substantial form and accidental form agree in part and differ in part. Indeed, they agree in this, that each is an act according to which something is in some way in act. But they differ in two ways. First, because substantial form makes to be simply and its subject is being in potency alone. But accidental form does not make to be simply, but rather to be such, or to such an extent, or in some way; for its subject is being in act. Whence, it is clear that actuality is found in substantial form before it is found in its subject. And because the first is the cause in any genus, substantial form causes existence in act in its subject. But, conversely, actuality is found in the subject of accidental form before it is found in accidental form. Hence, the actuality of accidental form is caused by the actuality of its subject, such that the subject [of accidental form], insofar as it is in potency, is receptive of accidental form, but insofar as it is in act, it is productive of it. And I say this concerning proper and *per se* accidents. For with respect to extraneous accidents, the subject is only receptive; but what is productive of such is the extrinsic agent. Secondly, substantial form and accidental form differ because, since the less principal is for the sake of the more principal, matter exists for the sake of substantial form, but, conversely, accidental form exists for the sake of the completion of the subject.[74]

In this text St. Thomas manifests two principal similarities and two principal differences between

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[74] ...forma substantialis et accidentalis partim conveniunt, et partim differunt. Conveniunt quidem in hoc, quod utraque est actus, et secundum utramque est aliquid quodammodo in actu. Differunt autem in duobus. Primo quidem, quia forma substantialis facit esse simpliciter, et eius subiectum est ens in potentia tantum. Forma autem accidentalis non facit esse simpliciter; sed esse tale, aut tantum, aut aliquo modo se habens, subiectum enim eius est ens in actu. Unde patet quod actualitas per prius invenitur in forma substantiali quam in eius subiecto, et quia primum est causa in quolibet genere, forma substantialis causat esse in actu in suo subiecto. Sed e converso, actualitas per prius invenitur in subiecto formae accidentalis, quam in forma accidentali, unde actualitas formae accidentalis causatur ab actualitate subiecti. Ita quod subiectum, inquantum est in potentia, est susceptivum formae accidentalis, inquantum autem est in actu, est eius productivum. Et hoc dico de proprio et per se accidente, nam respectu accidentis extranei, subiectum est susceptivum tantum; productivum vero talis accidentis est agens extrinsecum. Secundo autem differunt substantialis forma et accidentalis, quia, cum minus principale sit propter principalius, materia est propter formam substantialem; sed e converso, forma accidentalis est propter completionem subiecti. *ST* I, q. 77, a. 6, vol. 5, pp. 245-246.

substantial form and accidental form. The similarities are that both of these forms are act and that in virtue of both of these forms something is made to be in act.

Yet they differ insofar as substantial form is that whereby the substance of which it is an essential part is caused to be a substance or to be simply speaking, whereas accidental form is that whereby the substance to which it belongs is caused to be such or in a certain respect. This first difference, says Cajetan, is a difference "in the quality of the formal effect" of these two respective forms.[75] For being simply speaking, which is the formal effect of substantial form, is qualitatively different from being such, which is the formal effect of accidental form.

Furthermore, St. Thomas notes that since the subject of substantial form is pure passive ability, it is manifest that actuality is found in substantial form before it is found in its subject. But what is first in any genus is the cause in that genus. Hence, it follows that "substantial form causes existence in act in its subject." The converse, however, is true regarding proper and *per se* accidental forms and their subject, namely substance. In other words, because actuality is in the latter before it is in the former, and since what is first in any genus is the cause in that genus, it follows that substance stands to its proper and *per se* accidental forms as an agent cause stands to its proper effect.[76] And, of course, substance also receives these same forms insofar as it has the passive ability

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[75] In his *Commentaria in Summa Theologiae* on *ST* I, q. 77, a. 6, vol. 5, p. 246, Cajetan says: "Convenientia in duobus: primo, in essentiali praedicato, scilicet, esse actum; secundo, *in effectu formali*, scilicet, secundum utramque aliquid esse actu. Et ex his datur intelligi tertium, quod subiectum utriusque est aliquo modo ens in potentia.

Differentia est in duobus. Primo, *in qualitate effectus formalis*; quia substantialis facit esse simpliciter; accidentalis vero tale, aut tantum... Secundo differunt, quia illius materia est propter illam; ista vero, e contra, est propter subiectum."

[76] Yet, St. Thomas points out that since the substance itself is in act through its substantial form, it is true to say that all of the proper and *per se* accidental forms ultimately flow from the essence of the substantial form belonging to the substance. See, *ST* I, q. 77, a. 6, vol. 5, p. 246. And in the *ad 2um* of the same article, he writes: "...subiectum est causa proprii accidentis et finalis, et quodammodo activa; et etiam ut materialis, inquantum est susceptivum accidentis. Et ex hoc potest accipi quod essentia animae est causa omnium potentiarum sicut finis et

to do so.[77] Furthermore, regarding accidental forms which do not belong to a given substance properly and *per se*, St. Thomas states, "the subject [i.e., the substance] is only receptive; but what is productive of such is the extrinsic agent."[78]

Now the second difference pointed out between substantial form and accidental form is that, since the less principal is for the sake of the more principal, first matter (which is less principal) is for the sake of substantial form (which is more principal), whereas accidental form (which is less principal) is for the sake of its proper subject, namely, substance (which is more principal). Yet in what way is substantial form "more principal" than first matter, and substance "more principal" than accidental form? It seems as though the answer has to be that each is more principal in terms of actuality, as St. Thomas has just manifested so well. That is, actuality is found in substantial form before it is found in first matter. Likewise, actuality is found in substance before it is found in the accidental forms which belong to that substance. Thus, according to actuality, substantial form is more principal than first matter, while substance is more principal than the accidental forms belonging to it.

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sicut principium activum; quarundam autem sicut susceptivum."

[77] Regarding this passive ability which belongs to substance, St. Thomas says: "Sciendum...quod substantia corporalis habet quod sit subjectum accidentium ex materia sua, cui primo inest subjici alteri." *In Sent.*, Bk 4, d. 12, q. 1, a. 1, qc. 3, vol. 4, p. 502. In other words, since to be subject to another belongs to first matter before it belongs to the substance of which first matter is an essential part and since whatever is first in a genus is the cause in that genus, it follows that it is owing to its first matter that natural substance is able to underlie or receive its accidental forms.

Thus, Joseph Bobik can fittingly say that, "A bodily substance is both receptive (through the receptivity of prime matter) and productive (through the dynamism of the substantial form) of its proper and *per se* accidents." From his, "St. Thomas on the Individuation of Bodily Substances," in Fr. Henry Koren, C.S.Sp., *Readings in the Philosophy of Nature* (Westminster, MD: Newman Press, 1958), p. 340.

[78] Nevertheless, abstracting from the difference between *per se* accidents and those caused by some extrinsic agent, St. Thomas states the following in chapter one of *DPN*, vol. 43, p. 39: "...simpliciter loquendo forma [i.e., forma substantialis] dat esse materiae, sed subiectum accidenti, licet aliquando unum sumatur pro altero, scilicet materia pro subiectum et e converso."

Another difference between substantial form and accidental form is that only the former gives existence both to the whole natural body to which it belongs and to every one of that body's parts. Speaking to this difference, the Angelic Doctor states:

> ...substantial form is not only the perfection of the whole body, but also of every part of the body. For, since the whole body consists of its parts, the form of the whole body which does not give existence to the individual parts is a form which is composition and order, as is the form of a house. And such a form is accidental.[79]

This argument can be stated more formally as follows: substantial form, which is the form of the whole natural body to which it belongs, either gives existence to every part of that body or does not give existence to every part of that body. But if substantial form does not give existence to every part of the natural body, then substantial form would be no more than the form of composition and order (as the form of a house consists in the composition and order of the various parts of the house).[80] But if substantial form were no more than the form of composition and order, then substantial form would be a kind of accidental form which, of course, is absurd. Hence, it is false to say that substantial form does not give existence to every part of the natural body to which it belongs. Therefore, we must maintain that substantial form is the form of the whole natural body to which it belongs and that it

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[79] Substantialis autem forma non solum est perfectio totius, sed cuiuslibet partis. Cum enim totum consistat ex partibus, forma totius quae non dat esse singulis partibus corporis, est forma quae est compositio et ordo, sicut forma domus, et talis forma est accidentalis. *ST* I, q. 76, a. 8, vol. 5, p. 232. Likewise, in Bk. 2, ch. 72 of the *SCG*, vol. 13, pp. 456-457, St. Thomas writes: "Sic autem anima est forma totius corporis quod etiam est forma singularium partium. Si enim esset forma totius et non partium, non esset forma substantialis talis corporis: sicut forma domus, quae est forma totius et non singularium partium, est forma accidentalis." See also, *De anima*, q. 10 *ad* 16*um*, vol. 24, 1, p. 94.

[80] What St. Thomas has in mind here is that the things that come together in the building of a house (e.g., wood, bricks, drywall, etc.) do not depend on being put together and ordered in a certain way in order to be what they are. For example, bricks are as much bricks before they are put together to form a chimney as they are when they are actually constituent parts of the chimney. Hence, it is the form of the house which, as an accidental form, depends on the existence of the things that come together in the building of a house rather than the converse.

gives existence to every one of that body's parts.[81]

A further difference between substantial form and accidental form is that there can be only one substantial form in a substance, whereas there can be many accidental forms in a substance. Addressing the first of these points, St. Thomas maintains the following:

> ...this is the difference between substantial form and accidental form, that accidental form does not make a being to be in act simply speaking, but to be in act in such a way or to a certain extent, as for example, [to be] big or white or something of this sort. But substantial form makes [something] to be in act simply speaking. Whence, accidental form comes to a subject already pre-existing in act. But substantial form does not come to a subject already pre-existing in act, but existing in potency only, namely, first matter. But from this it is clear that it is impossible for many substantial forms to belong to one thing, since the first would make it to be a being in act simply speaking and all of the others would come to a subject already existing in act. Hence, [all of the other so-called substantial forms] would come accidentally to a subject already existing in act, for they would not make a being to be in act simply speaking, but only in a certain respect. From this the position of Avicebron, in the book *Fontis vitae*, is done away with. He posited that according to the order of genera and species, there is an order of substantial forms in one and the same thing, such that in this individual man there is one form, through which he is a substance, and another through which he is a body, and a third, through which he is a living body, and so on for the others. Now, from what was said above, it must be said that there is one and the same form through which this individual is this something, or a substance, and through which he is a living body, and so on for the others. For a more perfect form gives to matter that which a less perfect form gives, and more besides.[82]

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[81] St. Thomas often points out that the reason why the parts of an animal (e.g., hands, eyes, etc.) cease to be what they are when they are separated from the body to which they belong is because the substantial form of an animal (i.e., its soul) gives substantial existence not only to the animal, but also to each of its individual parts. See, for example, *ST* I, q. 76, a .8, vol. 5, p. 232; *SCG*, Bk. 2, ch. 72, vol. 13, pp. 456-457; *De spir. creat.*, a. 4, vol. 24, 2, p. 52; and *De anima*, q. 10, vol. 24, 1, p. 90.

[82] ... haec est differentia formae substantialis ad formam accidentalem, quod forma accidentalis non facit ens actu simpliciter, sed ens actu tale vel tantum, utputa magnum vel album vel aliquid aliud huiusmodi. Forma autem substantialis facit esse actu simpliciter. Unde forma accidentalis advenit subiecto iam praeexistenti actu. Forma autem substantialis non advenit subiecto iam praeexistenti in actu, sed existenti in potentia tantum, scilicet materiae primae. Ex quo patet, quod impossibile est unius rei esse plures formas substantiales; quia prima faceret ens actu simpliciter, et omnes aliae advenirent subiecto iam existenti in actu, unde accidentaliter advenirent subiecto iam existenti in actu, non enim facerent ens actu simpliciter sed secundum quid.

Per quod tollitur positio Avicebron in libro Fontis vitae, qui posuit quod secundum ordinem generum et specierum est ordo plurium formarum substantialium in una et eadem re; ut puta quod in hoc individuo hominis est una forma, per quam est substantia: et alia, per quam est corpus: et tertia, per quam est animatum corpus, et sic de

Here we see that it is the very nature of substantial form which precludes there being more than one substantial form in a substance. In other words, it is because the very union of substantial form and first matter results in a substance or what is simply speaking that it necessarily follows that any other form which is super-added thereto would be a form super-added to an already existing substance and, therefore, would be an accidental form.

Further, if we assume, *per impossibile*, that there could be two or more substantial forms in first matter at the same time, then one and the same substance would have two or more substantial existences at the same time and, therefore, would be both one and many substances at once, which, of course, is absurd.[83] Thus, it follows that there can be only one substantial form in any given substance. Hence, it seems that the position of Avicebron, as well as of anyone else who posits an actual plurality of substantial forms in a substance, involves a fundamental misunderstanding of the difference between accidental form and substantial form.[84]

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aliis. Oportet enim secundum praemissa dicere, quod una et eadem forma substantialis sit, per quam hoc individuum est hoc aliquid, sive substantia, et per quam est corpus et animatum corpus, et sic de aliis. Forma enim perfectior dat materiae hoc quod dat forma minus perfecta, et adhuc amplius. *In de Anima*, Bk. 2, *capitulum* 1, vol. 45, 1, p. 70.

[83] ...cum omnis forma det aliquod esse, et impossibile sit unam rem habere duplex esse substantiale, oportet, si prima forma substantialis adveniens materiae det sibi esse substantiale, quod secunda superveniens det esse accidentale... *In Sent.*, Bk. 2, d. 18, q. 1, a. 2, vol. 2, p. 452.

[84] There may be other fundamental misunderstandings involved in the Avicebronian position as well. For example, both what is required in order for us to form our various logical intentions and the doctrine of virtual presence seem to be lost on this position. While we cannot pursue either of these matters at length presently, the following text from St. Thomas will have to suffice: "...dicendum quod non oportet secundum diversas rationes vel intentiones logicas, quae consequuntur modum intelligendi, diversitatem in rebus naturalibus accipere, quia ratio unum et idem secundum diversos modos apprehendere potest. Quia igitur, ut dictum est, anima intellectiva virtute continet id quod sensitiva habet, et adhuc amplius; potest seorsum ratio considerare quod pertinet ad virtutem sensitivae, quasi quoddam imperfectum et materiale. Et quia hoc invenit commune homini et aliis animalibus, ex hoc rationem generis format. Id vero in quo anima intellectiva sensitiva excedit, accipit quasi formale et completivum, et ex eo format differentiam hominis." *ST* I, q. 76, a. 3 *ad 4um*, vol. 5, p. 221.

In addition to this, John Goyette says: "...those who posit a plurality of forms confuse formal and efficient causality. They conceive of the form as a mover that governs and directs the material rather than as an intrinsic principle that causes the matter to be. Indeed, St. Thomas indicates that the plurality of forms hypothesis is not an

By contrast, it hardly needs to be pointed out that there can be many accidental forms in a substance. For it is manifest to us that the substances which we know thanks to our common experience have a multiplicity of accidents at any given time. Nevertheless, it is also clear to us that the many accidents which are in a substance are therein in a certain order. Illustrating merely a part of this order, St. Thomas says:

> ...an accident as such cannot be the subject of an accident. But one accident is received in substance before another, as quantity before quality. And in this way one accident is said to be the subject of another, as surface of color, insofar as through one accident mediating substance receives another.[85]

Now from the fact that it is necessary for certain accidental forms to stand in between substance and some other accidental form, one might wonder whether something similar pertains to first matter and substantial form. In other words, one might wonder whether there must be certain accidental forms pre-existing in matter as dispositions for the reception of a certain substantial form. Is such a scenario necessary or even possible?

St. Thomas addresses this very question on many occasions. In the *Prima pars* of the *ST*, he

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adaptation of the hylomorphic theory at all; it is a disguised version of the Platonic view of the soul as the sailor in the ship, that is, a mover of the body rather than a form of the body." From his, "St. Thomas on the Unity of Substantial Form," *Nova et Vetera* 7 (2009), p. 782.

For an historical consideration of the development of pluriformism leading up to the time of St. Thomas, see, Fr. Daniel Callus, O.P., "The Origins of the Problem of the Unity of Form," *The Thomist* 24 (1961), pp. 257-285.

[85] ...accidens per se non potest esse subiectum accidentis; sed unum accidens per prius recipitur in substantia quam aliud, sicut quantitas quam qualitas. Et hoc modo unum accidens dicitur esse subiectum alterius, ut superficies coloris, inquantum substantia uno accidente mediante recipit aliud. *ST* I, q. 77, a. 7 *ad* 2*um*, vol. 5, pp. 247-248 In another, related text, St. Thomas writes: "Ad primum ergo dicendum, quod prima accidentia consequentia substantiam sunt quantitas et qualitas; et haec duo proportionantur duobus principiis essentialibus substantiae, scilicet formae et materiae (unde magnum et parvum Plato posuit differentias materiae); sed qualitas ex parte formae. Et quia materia est subjectum primum quod non est in alio, forma autem est in alio, scilicet materia; ideo magis appropinquat ad hoc quod est non esse in alio, quantitas quam qualitas, et per consequens quam alia accidentia." *In Sent.*, Bk. 4, d. 12, q. 1, a. 1, qc. 3, *ad* 1*um*, vol. 4, p. 502. This issue of how various accidents come forth principally either from matter or from substantial form is one which will be addressed in some detail in chapters eight and nine.

gives the following answer:

> ...it is impossible for some accidental disposition to fall in between...any substantial form and its matter. And the reason is that since matter is in potency to all acts in a certain order, it is necessary that what is first amongst acts be understood [to be] first in matter. But amongst all acts, the first is [substantial] existence. It is impossible, therefore, to understand matter to be hot, or to be so big, before understanding it to be in act. But matter has existence in act through substantial form which makes it to be simply speaking.... Hence, it is impossible for any accidental dispositions to pre-exist in matter prior to substantial form...[86]

St. Thomas's argument looks back to the fundamental fact that to be simply speaking is naturally before to be in a certain respect. That is, matter must have the act that it receives from substantial form before it can have the act which it in some way receives from accidental form. This is why it is impossible for us to conceive of something being hot, cold, big, or small without first understanding that what has these attributes is something, namely, a substance of some kind. For this reason, it is impossible for there to be any accidental form standing in between first matter and substantial form. Rather, every accidental form as such presupposes the immediate union of first matter and substantial form. For it is only through the immediate union of these two *per se* principles and causes that a substance is constituted which, in turn, can be the subject of the aforementioned accidental forms.

### 4. Two Final Differences between Substantial Form and Accidental Form

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[86] ...impossibile est quod aliqua dispositio accidentalis cadat media inter inter quamcumque formam substantialem et materiam suam. Et huius ratio est quia, cum materia sit in potentia ad omnes actus ordine quodam, oportet quod id quod est primum simpliciter in actibus, primo in materia intelligatur. Primum autem inter omnes actus est esse. Impossibile est ergo intelligere materiam prius esse calidam vel quantam, quam esse in actu. Esse autem in actu habet per formam substantialem, quae facit esse simpliciter, ut iam dictum est. Unde impossibile est quod quaecumque dispositiones accidentales praeexistant in materia ante formam substantialem. *ST* I, q. 76, a. 6, vol. 5, p. 229.

Now the final two differences between substantial form and accidental form which we shall note here are best stated in terms of differences between substantial becoming and accidental becoming. The first of these differences is that every substantial becoming involves a *resolutio omnis formae usque ad materiam primam*, whereas no accidental becoming as such involves any such *resolutio*. In saying this, we mean that whenever first matter acquires a new substantial form in substantial becoming, it necessarily loses all of the forms which it had beforehand, both substantial or accidental.[87] By contrast, whenever a substance acquires a new accidental form in accidental becoming, it does not lose all of the forms which it had beforehand.

That the latter is so should be quite evident. For since in every accidental becoming there is a substance which underlies the change from beginning to end (and, hence, remains the substance which it is throughout the change), and since in order for this substance to remain the substance which it is throughout the change it must retain its substantial form from the beginning of the change to the end of the change, it follows that in every accidental becoming there is a substance which retains its substantial form from the beginning of the change to the end of the change.[88]

From what we have established above, however, we can come to see that whenever first matter acquires a new substantial form, it must lose all of the forms, both substantial and accidental, which it had beforehand. First of all, it is manifest that first matter must lose the substantial form which it had beforehand since, by hypothesis, first matter is acquiring a new substantial form and

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[87] As John of St. Thomas puts it, "Resolvi usque ad materiam primam idem est, quod spoliari materiam primam omni formam tam substantiali quam accidentali, quando fit generatio." *Cursus Philosophicus, Nat. Phil.*, p. 3, q. 1, a. 6, p. 581.

[88] It is also quite evident that many of the accidents or accidental forms which are in a substance before an accidental becoming survive the accidental becoming. For example, Mr. Smith's shape survives his becoming musical.

since, as we have seen above, it is impossible for it to have more than one substantial form at any given time. Hence, in order for first matter to acquire a new substantial form, it must lose the substantial form which it had beforehand. But if first matter loses the substantial form which it had beforehand, then the substance to which first matter belonged as an essential part must cease to be. For just as a substance comes to be when first matter acquires a substantial form which it previously lacked, so too a substance ceases to be when first matter loses a substantial form which it previously had.

Furthermore, from what we have shown above, it is clear that if any substance cease to be, all of the accidents or accidental forms which depend on that substance must also cease to be. For we saw above that accidents or accidental forms depend for their being on the substance which underlies them. And we have just concluded that if first matter loses the substantial form which it had beforehand, then the substance to which the first matter belonged as an essential part must cease to be. Hence, we must maintain that if first matter loses the substantial form which it had beforehand, then all of the accidents or accidental forms which depend on the substance to which first matter belonged as an essential part must also cease to be. Putting these things together, then, it is clear that every substantial becoming involves a *resolutio omnis formae usque ad materiam primam*, whereas no accidental becoming as such involves any such *resolutio*.

Now the final difference between substantial form and accidental form which we shall note here is that every substantial form is instantaneously acquired by first matter, whereas not every accidental form is instantaneously acquired by substance. Addressing the principle of this difference, St. Thomas maintains:

> ...it must be known that when a change is said to be in an instant, it is not to be

understood that the two terms of the change are in an instant. For this is impossible, since every change is between opposite terms, speaking *per se*. Rather, it is to be understood that the transition from one term to the other is in an instant. Now this occurs with some opposites, but not with others. For when between the terms of the motion there is something in the middle, it is necessary that the transition from one term to the other be successive since what is in the middle is that into which what moves continuously is first changed prior to the term, as is clear from the Philosopher in Book Five of the *Physics*. And by "what is in the middle," I mean any distance from the extremes, whether it be a distance in position, as in locomotion; or distance according to the nature of quantity, as in the motion of growth and shrinking; or according to the nature of form, as in alteration; and, in this case, what is in the middle is either of another species, as pale is between white and black, or of the same species, as less hot is between more hot and cold. But when between the two terms of the change or motion there cannot be something in the middle in some one of the aforementioned ways, then the transition from one term to another is not in time, but in an instant. Now this occurs when the two terms of motion or change are affirmation and negation, or privation and form. For between affirmation and negation there is no medium of any kind, nor in the case of privation and form as regards the proper subject. And I say this regarding the way in which something of another species is what is in the middle between the extremes. But regarding the way in which something is in the middle according to more and less, although there cannot be something in the middle *per se*, there can be something in the middle *per accidens*. For negation or privation, speaking *per se*, is not increased or decreased. Nevertheless, *per accidens*, according to its cause, some increase or decrease [of negation or privation] can be considered. For example, a man who has his eye removed is said to be more blind than one who has his eye covered, since the cause of blindness is more efficacious. Hence, considering changes of this sort according to their proper terms, speaking *per se*, it is necessary that they be instantaneous and not in time, as in the case of illumination, generation, and corruption, and other changes of this sort. Considering these changes, however, according to the causes of their terms, it is possible to consider them [to be] successive, as is clear in illumination. For, although the air suddenly transitions from darkness to light, nevertheless, the cause of darkness (i.e., the absence of the sun) is successively removed through the sun coming to be present successively by local motion. And, thus, illumination is the term of local motion, and it is indivisible, as is every term of what is continuous.[89]

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[89] ...sciendum est, quod quando dicitur aliqua mutatio esse in instanti, non intelligitur quod duo termini eius sint in instanti: hoc enim est impossibile, cum omnis mutatio sit inter terminos oppositos, per se loquendo; sed intelligitur quod transitus de uno termino in alium est in instanti: quod quidem in aliquibus oppositis contingit, in aliquibus non contingit. Quando enim inter terminos motus est accipere aliquod medium, oportet quod transitus de uno termino in alium sit successivus, quia medium est in quod primo mutatur quod movetur continue, quam in ultimum; ut patet per philosophum in V Phys.: et intelligo medium per qualemcumque distantiam ab extremis, sive sit distantia in situ, sicut in motu locali; sive sit distantia secundum rationem quantitatis, sicut in motu augmenti et

From this text we can see both why first matter acquires the substantial form of Mr. Smith's corpse in an instant and why a substance such as water acquires the accidental form of heat in time. In the first case, it is obvious that there is no third substance between the substance which is Mr. Smith and the substance which is his corpse. For as soon as Mr. Smith loses his substantial form and, thus, passes away, his corpse immediately comes to be. Furthermore, neither Mr. Smith nor his corpse admit of more or less.[90] From this, we see that there is no substantial form which can be acquired by first matter between its being subject to the substantial form of Mr. Smith and its being subject to the substantial form of his corpse. But if this is so, then it must be the case that the change or substantial becoming whereby Mr. Smith becomes the corpse of Mr. Smith does not take place successively and in time, but rather indivisibly and in an instant.[91] That is, first matter must both lose the substantial form of Mr. Smith and acquire the substantial form of his corpse in the very same instant.

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diminutionis; sive secundum rationem formae, ut in alteratione; et hoc, sive illud medium sit alterius speciei, sicut pallidum inter album et nigrum; sive eiusdem speciei, sicut minus calidum inter magis calidum et frigidum. Quando vero inter duos terminos mutationis vel motus non potest esse medium aliquo praedictorum modorum, tunc transitus de uno termino in alterum non est in tempore, sed in instanti. Hoc autem est quando duo termini motus vel mutationis sunt affirmatio et negatio, sive privatio et forma. Nam inter affirmationem et negationem nullo modo est medium; neque inter privationem et formam circa proprium susceptibile. Et hoc dico per modum quo aliquid alterius speciei est medium inter extrema. Sed per modum quo aliquid est medium secundum intensionem et remissionem, etsi non possit esse medium per se, potest tamen esse medium per accidens. Nam negatio sive privatio, per se loquendo, non intenditur neque remittitur; sed per accidens secundum suam causam potest considerari aliqua eius intensio vel remissio: ut dicatur magis esse caecus ille qui habet oculum erutum, quam ille qui habet aliquem pannum in oculo, ex eo quod causa caecitatis est efficacior. Sic igitur accipiendo huiusmodi mutationes secundum proprios terminos, per se loquendo, oportet eas esse instantaneas, et non in tempore; sicut est illuminatio, generatio et corruptio, et alia huiusmodi. Accipiendo vero eas quantum ad causas suorum terminorum, potest in eis considerari successio; sicut patet in illuminatione. Nam quamvis aer subito transeat de tenebris ad lumen, tamen causa tenebrositatis successive tollitur, scilicet absentia solis, qui per motum localem successive fit praesens: et sic illuminatio est terminus motus localis, et est indivisibilis, sicut et quilibet terminus continui. *De veritate*, q. 28, a. 9, vol. 22, p. 846.

[90] *Categories*, ch. 5, 3b33-38.

[91] This is not to deny that we often speak in such a way that we imply that a change such as death takes place over time. We often say things such as, "Mr. Smith was dying for weeks." But when we speak this way we are in fact naming the alteration which terminates at a substantial becoming (e.g., a terminal illness) from the instantaneous substantial becoming at which it terminates (e.g., death). On this point see *In Phys.*, Bk. 6, *lectio* 8, vol. 2, p. 300 and *Quod.*, VII, q. 4, a. 2 *ad* 4, vol. 25, 1, p. 22.

In the case of the water becoming hot, however, it is plain that between the water being cold (at the beginning of the change) and the water being hot (at the end of the change) there is the motion which we call, "becoming hot." Throughout this motion the water in question imperfectly has the term-to-which of the motion.[92] A sign that this is true is that, if the motion were to be interrupted, we would then say of the water that, "it is somewhat hot," or something of this sort. As a result, we see both that the accidental form of heat is acquired by the water successively and that this same form admits of more and less (i.e., the water can be more or less hot). But if this is so, then it is clear that the water acquires the accidental form of heat in time and not instantaneously. Hence, by looking at these and other similar cases in light of St. Thomas's text, we can conclude that every substantial form is instantaneously acquired by first matter, whereas not every accidental form is instantaneously acquired by substance.

Lastly, we shall conclude our examination of the nature of substantial form by returning to a similarity between accidental and substantial form which was mentioned above. We noted above, following St. Thomas, that both of these forms are act and that in virtue of both of these forms something is made to be in act. Now the things that are made to be in act by these forms are their respective matters. Hence, we can say that form, whether accidental or substantial, is in some way a cause of its matter. Yet, on the other hand, it is also true to say that matter is in some way a cause of the form (whether accidental or substantial) which is in it. Addressing this reciprocal causality, St. Thomas writes:

> Form and matter are causes to each other as regards their existence. Form is indeed a cause to matter insofar as it gives to it existence in act; but matter is a cause to form

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[92] It should be evident that here we are considering accidental becoming not insofar as it is a *mutatio*, but insofar as it is a *motus*. For this distinction, see footnote eight above.

> insofar as it sustains it. I say that each of these is a cause of the existence of the other either simply speaking or in a certain respect. For substantial form gives existence to matter simply speaking. But accidental form [gives existence to its subject] in a certain respect, for this is proportionate to it as [accidental] form. Matter even sometimes does not sustain a form as regards its existence simply speaking, but insofar as it is the form of this [substance], having existence in this [matter], just as the human body stands to the rational soul.[93]

From this text we see that the two *per se* principles and causes in both accidental and substantial becoming depend on each other in order to be. Yet, they do not depend on each other in precisely the same way. For, as St. Thomas makes clear, every matter depends on its form insofar as the latter makes the matter to be in act, either simply speaking or in a certain respect. By contrast, every form depends on its matter insofar as the latter sustains the form in being, either simply speaking or in a certain respect. Now matter is said to sustain a form in being simply speaking if the form in question cannot be except in matter. On the other hand, matter sustains a form in a certain respect if the form depends on the matter, not in order to be simply speaking, but in order to be "the form of this [substance], having being in this [matter]," as St. Thomas puts it. Now the only form which is sustained by its matter in a certain respect is the substantial form of man, *id est*, the rational soul. Every other natural form, both substantial and accidental, depends on its respective matter in order to be sustained in being simply speaking.

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[93] Forma autem et materia sibiinvicem sunt causa quantum ad esse. Forma quidem materiae inquantum dat ei esse actu; materia vero formae inquantum sustentat ipsam. Dico autem utrumque horum sibi invicem esse causam essendi vel simpliciter vel secundum quid. Nam forma substantialis dat esse materiae simpliciter. Forma autem accidentalis secundum quid, prout etiam forma est. Materia etiam quandoque non sustentat formam secundum esse simpliciter, sed secundum quod est forma huius, habens esse in hoc, sicut se habet corpus humanum ad animam rationalem. *In Metaphys.*, Bk. 5, *lectio* 2, p. 257 (#775).

## 5. The Privation of Substantial Form

At this point it remains for us to make known the nature of the third principle of substantial becoming, namely the privation of substantial form. In the first part of this chapter we observed that the privation of form in general consists in the non-being or absence of a form in matter which is naturally apt to have such a form. Now since first matter is the matter which is naturally apt to have a substantial form, it stands to reason that the privation of a substantial form is nothing other than the non-being or absence of a substantial form in first matter.

Yet such an understanding of the nature of the third principle of substantial becoming raises at least two important questions. The first question inquires into the "kind" of privation that the lack of substantial form is, while the second question concerns the number of privations of substantial forms which are to be found in first matter. In order to set forth the first question more formally, let us see how St. Thomas distinguishes the two "kinds" of privation. In the *Prima secundae*, he writes:

> He who considers diligently will discover two kinds of privation. For there is a certain simple and pure privation which consists, as it were, in having been corrupted, as death is the privation of life and darkness is the privation of light. And such privations are not receptive of more and less since there is nothing left of the opposite habit. Whence, someone is not less dead after the first day and third or fourth day than after a year when the corpse has disintegrated. And, similarly, a house is not darker when the window is covered by many curtains than when it is covered only by one curtain which blocks out all of the light.
>
> There is another privation, however, which is not simple, but which retains something of the opposite habit. Indeed, this privation consists more in being corrupted, as in the case of sickness which entails a lack of the due proportion of the humors, but such that something of this remains. For, otherwise, the animal would not remain alive. And similarly with ugliness and other such things. But privations of this sort are receptive of more and less on the part of what remains of the opposite habit. For it is of great importance in sickness and ugliness as to whether something withdraws a lot or a little from the due proportion of the humors or members.[94]

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[94] Sed si quis diligenter consideret, inveniet duplex privationum genus. Est enim quaedam simplex et pura privatio, quae consistit quasi in corruptum esse, sicut mors est privatio vitae, et tenebra est privatio luminis. Et tales

In the first part of this chapter, it was unnecessary to distinguish between these two "kinds" of privation discussed by St. Thomas. For the principle of every becoming which we named "privation" is so general that it abstracts from both of these "kinds" of privation, much as the principle of every becoming which we named "form" abstracts from accidental and substantial form.[95] Since, however, the principle of substantial becoming which we call "privation" is more specific, it seems appropriate to inquire as follows: Which of these "kinds" of privation is the privation of a substantial form? Or, could it be that some privations of substantial form are of the first kind while others are of the second kind? The following text from John of St. Thomas helps to resolve these queries. He maintains that:

> ...we say that privation of form in matter is a privation in being since it is a privation of substantial form which is last with respect to all dispositions. And just as form constitutes a thing in being, so the privation of that form is a privation in being. But only a privation of dispositions or forms tending to some further form is called "a privation in becoming" and not "a privation in being," according to the rule of Divine Thomas in 1. 2. q. 73 art. 2. And only this privation in becoming admits of more and less, not privation in being, of which sort is the privation of substantial form. But the fact that matter is more or less impeded from the reception of some form does not vary the privation of that form according to more and less. Rather, it makes matter more or less disposed or adjusted to this or that form, and the privation of this disposition

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privationes non recipiunt magis et minus, quia nihil residuum est de habitu opposito. Unde non minus est mortuus aliquis primo die mortis, et tertio vel quarto, quam post annum, quando iam cadaver fuerit resolutum. Et similiter non est magis tenebrosa domus, si lucerna sit operta pluribus velaminibus, quam si sit operta uno solo velamine totum lumen intercludente. Est autem alia privatio non simplex, sed aliquid retinens de habitu opposito; quae quidem privatio magis consistit in corrumpi, quam in corruptum esse, sicut aegritudo, quae privat debitam commensurationem humorum, ita tamen quod aliquid eius remanet, alioquin non remaneret animal vivum; et simile est de turpitudine, et aliis huiusmodi. Huiusmodi autem privationes recipiunt magis et minus ex parte eius quod remanet de habitu contrario, multum enim refert ad aegritudinem vel turpitudinem, utrum plus vel minus a debita commensuratione humorum vel membrorum recedatur. *ST* I-II, q. 73, a. 2, vol. 7, pp. 26-27.

[95] In both of these cases we understand the abstraction to be without precision. See, *De ente*, ch. 2, vol. 43, pp. 371-372.

or adjustment admits of more and less.[96]

Here John of St. Thomas shows that the privation of substantial form must be the first "kind" of privation delineated above by St. Thomas (i.e., the privation that consists in "having been corrupted"). For just as substantial form is that by which a substance is simply speaking, so the privation of substantial form implies a lack of being simply speaking. But a lack of being simply speaking is a sort of "having been corrupted." Hence, the privation of substantial form is a sort of "having been corrupted."[97] Thus, the privation of substantial form must be the first "kind" of privation mentioned above.

Further, John of St. Thomas makes it clear that only the second "kind" of privation mentioned by St. Thomas admits of more and less. This, again, helps us to see that the privation of substantial form must consist in the first "kind" of privation. For just as substantial form does not admit of the more and less (for substance itself does not admit of the more and less), so neither does the privation of substantial form admit of the more and less. But the second "kind"of privation admits of the more and less. Hence, the privation of substantial form does not consist in the second "kind" of privation. Therefore, the privation of substantial form must consist in the first "kind" of privation mentioned above.

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[96] ...dicimus quod privatio formae in materia est privatio in facto esse, quia est privatio formae substantialis, quae est ultima respectu omnium dispositionum. Et sicut forma constituit rem in facto esse, ita privatio illius est privatio in facto esse. Sola autem privatio dispositionum seu formarum tendentium ad aliquam ulteriorem formam dicitur privatio in fieri, et non in facto esse iuxta regulam D. Thomae 1. 2. q. 73 art. 2., et haec sola privatio in fieri suscipit magis et minus, non autem in facto esse, qualis est privatio formae substantialis. Quod vero materia sit magis vel minus impedita ad receptionem alicuius formae, non variat privationem illius secundum magis vel minus, sed reddit magis vel minus dispositam seu applicatam materiam ad istam formam vel illam, et privatio huius dispositionis seu applicationis suscipit magis vel minus. *Cursus Philosophicus*, *Nat. Phil.*, p. 1, q. 5 a. 2., p. 99.

[97] We say "a sort" here, since not every "having been corrupted" involves a privation of substantial form. As St. Thomas's example of darkness shows, this first "kind" of privation obtains not only in the order of substance, but also in the order of accidents.

Having resolved the question regarding the "kind" of privation that the lack of substantial form consists in, let us now turn to the question regarding the number of these privations in first matter. We can put this query as follows: How many privations of substantial forms are there in the first matter of any given natural substance? John of St. Thomas gives us some assistance in answering this question as well. He states:

> There are as many privations in any matter as there are forms which it lacks. This is clear from what has been said since there are as many absences of forms as there are absent forms. But privation or lacking is nothing other than the absence of a form in a subject capable of having it. Moreover, this is so since privations can be multiplied according to the potencies of matter for receiving forms, since privation is founded on this very capacity and potency. But this capacity or potency is multiplied in matter with respect to forms, as St. Thomas teaches in 1 Phys. lect. 15, where he says, "the potency of matter is one in subject with respect to many forms, but there are many potencies in account according to the relation to many forms. Whence, in the third book of this work, it is said that the ability to be healed and the ability to be sick differ according to account." If, therefore, according to the multiplication of forms the inclination or potency to them is multiplied according to respect or relation, all the more will the privations or absences of such forms be multiplied according to the multiplication of them. Nevertheless, it is not true that privation will be able to be called one in subject or one entitatively, just as the potency of matter is said to be one in subject or one entitatively, although it is many respectively. For privation implies nothing positive or entitative as does the potency of matter, by reason of which it is identified and made one in the nature of a subject. Rather, privation signifies only a lack of form and thus is multiplied according to the multiplication of forms. Potency, on the other hand, because it is identified positively and entitatively with matter, as we said above, is made one in the nature of a subject.[98]

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[98] ...tot esse privationes in qualibet materia, quot sunt formae, quibus caret. Patet ex dictis, quia tot sunt absentiae formarum, quot sunt formae absentes. Nihil autem aliud est privatio seu carentia quam absentia formae in subiecto capaci. Et deinde, quia eo modo possunt multiplicari privationes, quo potentiae materiae ad suscipiendas formas, cum privatio in ipsa capacitate et potentia fundetur. Sed in materia multiplicatur ista capacitas seu potentia respectu formarum, ut docet S. Thomas 1. Phys. lect. 15., ubi inquit, quod "potentia materiae subiecto est una respectu multarum formarum, sed ratione sunt multae potentiae secundum habitudinem ad diversas formas. Unde in tertio huius dicetur, quod posse sanari et posse infirmari differunt secundum rationem." Ergo si ad multiplicationem formarum multiplicatur inclinatio seu potentia ad ipsas secundum respectum et habitudinem, multo magis carentiae et absentiae talium formarum multiplicabuntur ad multiplicationem earum. Nec tamen sicut potentia materiae dicitur una subiecto seu entitative, licet respective sit multiplex, ita privatio dici poterit una subiecto seu entitative, quia privatio nihil positivum importat aut entitativum sicut potentia materiae, ratione cuius identificetur et reddatur una rationesubiecti, sed dicit solam carentiam formae et sic multiplicatur ad multiplicationem formarum, potentia vero, quia identificatur positive et entitative cum materia, ut supra diximus, ideo redditur una ratione subiecti. *Cursus*

John of St. Thomas's argument shows quite lucidly that we must posit as many privations in first matter as there are substantial forms which first matter is able to have but does not presently have. For, if, as St. Thomas argues above, we must maintain that first matter is many in account, and this owing to the many substantial forms which it is able to underlie, then, we must also maintain that there are many privations in first matter, and this on account of the many substantial forms which first matter is able to underlie but does not presently underlie. In addition, John of St. Thomas makes it clear that while we can say that there are many privations in first matter (and, thus, that they are all one in subject), we cannot hold that privation itself is one in subject. For, unlike first matter, there is nothing positive about privation whereby it can be said to have the nature of a subject in any sense. Nonetheless, it is true to say that all of the privations which are in first matter are one in subject insofar as they all are in, as in a subject, the same *aliquid positive* which is first matter.[99]

Now after setting forth this argument, John of St. Thomas raises an intelligent objection against his own conclusion. He writes:

> Privation in matter denies every nature of actuality, whether entitative or formal, as we have said above. Thus, a single privation suffices for all forms, since the formal nature denied is one, even as it is specific, and the formal nature of the potency or appetite of matter is one with respect to all forms insofar as it desires in them corruptible substantial being.[100]

It seems that here John of St. Thomas is invoking the principle that *quod potest compleri per pauciora*

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*Philosophicus, Phil. Nat.*, p. 1, q. 5, a. 2, pp. 100-101.

[99] *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45.

[100] Privatio in materia negat omnem rationem actualitatis, sive entitative sive formalis, ut supra diximus... Ergo unica privatio sufficit ad omnes formas, quia ratio formalis negata unica est, sicut etiam specifica, et formalis ratio potentiae seu appetitus materiae unica est respectu omnium formarum, quatenus in illis appetit esse substantiale corruptibile. *Cursus Philosophicus, Phil. Nat.*, p. 1, q. 5, a. 2, p. 101.

*principia, non fit per plura.*[101] But to posit more than one privation of substantial form in first matter would be to multiply principles without necessity. For one such privation seems to be enough to negate what is common to all substantial forms, namely, the actuality which any and every substantial form gives to first matter. Hence, it would be superfluous to posit more than one privation of substantial form in first matter.

Finally, however, this objection fails to distinguish between the diverse ways in which the privation of substantial form and the ability for substantial form respectively stand to substantial form itself. Regarding this distinction, John of St. Thomas explains:

> ...the nature of privation and that of potency or appetite or other positive tendencies to their objects are diverse. For privation compares to form as an absence or lacking of it. Nevertheless, this absence does not correspond to form according to a tendency to it, as is claimed, but to the very presence or inherence which it has in the subject. This, however, is multiplied according to the multiplication of forms, just as lacking or absence. Thus, there are as many presences as there are present forms and, similarly, there are as many lackings or absences and privations as there are absent forms.[102]

From this response, we see that even if we grant that first matter desires substantial form in general, it does not follow that it can also lack substantial form in general. For we only say that first matter lacks substantial form because we see that there are certain substantial forms which are able to be in it but are not in it presently. Hence, the number of privations of substantial form which are in first matter must needs correspond to the number of substantial forms which could be in first matter but

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[101] *ST* I, q. 2, a. 3, 2*um*, vol. 4, p. 31.

[102] ...esse diversum rationem de privatione et de potentia seu appetitu vel aliis positivis tendentiis ad obiecta. Nam privatio comparatur ad formam ut absentia seu carentia illius, absentia autem non correspondet formae secundum tendentiam ad ea, circa quae versatur, sed ipsi praesentiae seu inhaerentiae, quam habet in subiecto. Haec autem multiplicatur ad multiplicationem formarum, sicut carentia seu absentia, et ideo tot sunt praesentiae, quot formae praesentes, et similiter tot carentiae seu absentiae et privationes, quot formae absentes. *Cursus Philosophicus, Phil. Nat.*, p. 1, q. 5, a. 2, p. 101.

are not in it here and now. Now since, as we have seen above, only one substantial form is able to be in first matter at any given time, it follows that the first matter in any natural substance must be the subject of as many privations of substantial forms as there are substantial forms under the sun (save the one which it already has, of course). For, it seems to be the case that the first matter in any natural substance is able to acquire the substantial form of any other natural substance under the sun.

This last statement, though, raises one final objection. For there appears to be some reason to deny that the first matter in certain natural substances is able to receive every other substantial form. For example, is the first matter in a single grain able to receive the substantial form of an elephant? Or, is the first matter in a stone able to receive the substantial form of a man?[103] The answers to both of these questions would seem to be in the negative.

Yet, as with the previous objection, this one too fails to distinguish what needs to be distinguished. Answering this objection, John of St. Thomas states:

> ...every matter is capable of receiving any form mediately or immediately, totally or partially. [For] just as the matter of an ant or a stone, under these dispositions, is unable to receive the form of a man or of an elephant, nonetheless, under other dispositions, of which it is capable of receiving, this matter is able [to receive such forms]. Now even if a small amount, such as a grain, is not able to receive the whole form of an elephant, nevertheless, it is able to be a part of it [i.e., the elephant], and, thus, it is able to be informed by its form.[104]

From this text, then, we see that whether mediately or immediately the first matter in any natural

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[103] Here we are basically stating the following objection from John of St. Thomas: "Nam in qualibet materia non est privatio cuiuscumque formae, quia non quaelibet materia est capax cuiuscumque formae, v.g., materia unius grani non est capax formae elephantis. Ergo non omnis materia est privata quacumque forma." *Cursus Philosophicus, Phil. Nat.*, p. 1, q. 5, a. 2, p. 101.

[104] ...omnem materiam esse capacem cuiuscumque formae mediate vel immediate, totaliter vel partialiter, sicut materia formicae vel lapidis sub illis dispositionibus non est capax formae hominis vel elephantis, sed sub aliis dispositionibus, quarum dispositionum capax est. Quodsi tam parva quantitas ut granum non est capax totius formae elephantis, est tamen capax, ut sit pars illius, et sic informari potest ab eius forma. *Cursus Philosophicus, Phil. Nat.*, p. 1, q. 5, a. 2, p. 101.

substance is able to acquire the substantial form of any other natural substance under the sun. And even though the first matter in some small substance is unable to receive the whole substantial form of some larger substance, the small substance is able to become part of the larger substance and, thus, its first matter is able to be informed by the substantial form of that larger substance. Hence, the first matter in any natural substance must be the subject of as many privations of substantial forms as there are substantial forms under the sun (save the one which it already has, of course).

In closing, we should note that we have come to know not only first matter, but the other two principles of substantial becoming as well through the use of certain proportions or analogies.[105] For just as we explicitly utilized a proportion in order to know the nature of first matter, so too we have used, at least implicitly, similar proportions in order to know what substantial form and the privation of substantial form are. That is, we said above that, bronze : statue :: first matter : substance. But, in a similar way, we have also relied on proportions such as, accidental form : substance :: substantial form : first matter, and, privation of accidental form : substance :: privation of substantial form : first matter. From the second of these proportions, for example, we have come to see that just as accidental form is that by which its proper subject (i.e., substance) is actualized and, thus, made to be in a certain respect, so substantial form is that by which its proper subject (i.e., first matter) is actualized and, thus, made to be part of what is simply speaking. Similarly, from the third of these proportions we have come to know that just as the privation of accidental form is the non-being of

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[105] It is important to distinguish here, as Ralph McInerny notes, between knowing by analogy and analogous naming. Regarding this he writes: "Knowledge by analogy, or proportionality, cannot be identified with analogous naming, even though it is a knowledge on which naming may be based. When we come to know X by analogy with Y, we tend to call X a Y. But to call X a Y is not necessarily to name it analogically. We may come to know that 8:4 from a consideration of 4:2, but "double" is predicated univocally of both proportions. As a matter of fact, as often as not Thomas sees the *similitudo proportionalitatis* as productive of the metaphorical use of a term." From, *Aquinas on Analogy* (Washington, D.C.: CUA Press, 1996), pp. 150-151. See also, *The Logic of Analogy*, pp. 144-145.

an accidental form in a substance able to have that form, so the privation of substantial form is the non-being of a substantial form in first matter able to have that substantial form. Thus, it is clear that we have come to know the natures of all three principles of substantial becoming by means of certain proportions or analogies.

## 6. Résumé

In this chapter we attempted to arrive at an understanding, *per modum demonstrationis*, of the *principia naturae* by following the *via resolutionis*. Respecting the proper *modus procedendi* laid down in chapter three, in this first part of this chapter we gleaned a most general understanding of the principles of nature. After making clear that our common understanding of accidental becoming reveals that we conceive of accidental becoming in terms of matter, form, and privation, we manifested the fact that matter, form, and privation are indeed found not only in every accidental becoming, but also in every substantial becoming. Thereafter, we argued that matter, form, and privation are principles of every becoming which can be considered either as two opposite principles and one material principle, or as two *per se* principles and one *per accidens* principle.

In the second part of the chapter, we arrived at a specific understanding of the natures of the matter, form, and privation proper to substantial becoming. In so doing, we delineated how first matter, substantial form, and the privation of substantial form are, in various ways, both similar to and different from the principles proper to accidental becoming, namely, substance, accidental form, and the privation of accidental form. Lastly, we noted that proportions or analogies were used throughout the chapter in order for us to come to know not only the nature of first matter, but of substantial form and the privation of substantial form as well.

## Chapter Seven: The Definitive Answer to the Question, Cont'd

In this chapter we shall attempt to show how our more determinate knowledge of the principles of natural things enables us both to account for what we know from our common experience and to resolve the difficulties raised by *Monism* and *Pluralism*. In order to accomplish these two ends most efficaciously, we shall attempt to mirror in our consideration the four things which Aristotle and St. Thomas say manifest the fact that one has a complete understanding of something. In Book Four, Chapter Four of the *Physics*, and in the commentary thereon, Aristotle and St. Thomas respectively maintain that if one has a complete understanding of something, he should be able 1) to make known what the thing in question is, 2) give the cause or reason for the properties which flow from the nature of the thing made known, 3) solve the difficulties concerning the nature of the thing made known, and 4) explain why those who have erred in their understanding of the nature of the thing made known have made their errors.[1]

Assuming, then, that at this point we have something of a complete understanding of the natures of the principles of substantial becoming or the *principia naturae*, we shall here attempt to

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[1] The text in question from Aristotle reads: "One must try to make the consideration such as will demonstrate the 'what it is,' so as to solve the difficulties, and [such that] what seems to be in place will be so, and, moreover, [so as] to make apparent the cause of the perplexity and of the difficulties about it. For thus most beautifully would each thing be shown." In his commentary, St. Thomas writes: "Et dicit quod in definiendo locum, intentio nostra debet ad quatuor attendere, quae quidem necessaria sunt ad definitionem perfectam. Primo quidem, ut ostendatur quid sit locus: nam definitio est oratio indicans quid est res. Secundo, ut solvantur quaecumque opposita sunt circa locum: nam cognitio veritatis est solutio dubitatorum. Tertium est, quod ex definitione data manifestentur proprietates loci, quae insunt ei: quia definitio est medium in demonstratione, qua propria accidentia demonstrantur de subiectis. Quartum est, quod ex definitione loci erit manifesta causa, quare aliqui discordaverunt circa locum; et omnium quae sunt opposita circa ipsum. Et sic pulcherrime definitur unumquodque" *In Phys.*, Bk. 4, *lectio* 5, vol. 2, p. 159. In what was said above, all we have done is generalized the points made here by Aristotle and St. Thomas. Note well that above we have changed the order of the second and third points mentioned by both Aristotle and St. Thomas. This has been done for stylistic reasons, rather than for doctrinal reasons. By switching these second and third points, we keep together the two points (Aristotle and St. Thomas's first and third points) which deal most proximately with the making known of the nature of something and its properties as well as the two points (Aristotle and St. Thomas's second and fourth points) which deal with difficulties or errors made by others about the nature of the thing made known.

do the following four things: 1) make known, in terms of a specific understanding of the *principia naturae* themselves, what in fact occurs when this substance of this kind becomes that substance of that kind, 2) show that only a specific understanding of the natures of first matter, substantial form, and privation is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind between the substances involved in substantial becoming, and c) the reality of substantial becoming itself, 3) provide a definitive resolution to the difficulty raised by *Monism* and *Pluralism*, and 4) explain why the proponents of *Monism* and *Pluralism* have erred in their understanding of the *principia naturae*.[2]

## 1. The *Principia Naturae* and This Substance of This Kind Becoming That Substance of That Kind

Let us begin, then, with the first of these tasks. Given what was established in the last chapter, we must maintain that whenever this substance of this kind becomes that substance of that kind, first matter acquires a substantial form which it previously lacked. Furthermore, since first matter can underlie only one substantial form at a time, first matter must lose the substantial form which it has in order to acquire the substantial form which it is able to have but does not have. Also, since the substance which comes to be is different in kind from the substance which ceases to be, the substantial form which first matter loses must differ in kind from the substantial form which it

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[2] It is essential to note that here we are in a way *adapting* the four points mentioned by Aristotle and St. Thomas to our present consideration. This is especially evident regarding what we have proposed to do in the second place. For, it would not be true to say that the substantial unity of the substances involved in substantial becoming, the differences in kind amongst the substances involved in substantial becoming, and the reality of substantial becoming itself are "properties" of the change that we have ubiquitously described as "this substance of this kind becomes that substance of that kind." Rather, it seems more proper to say that the former are something more like integral parts of the latter.

acquires. Bringing these truths together, we must hold that when this substance of this kind becomes that substance of that kind, what essentially occurs is this: first matter both loses the substantial form of one kind, which it has, and acquires a substantial form of another kind, which it previously lacked. Thus, in terms of the examples we have been using heretofore, we must say that whenever these human reproductive cells, or these equine reproductive cells, or this acorn become(s) Mr. Smith, or this horse, or this oak tree, respectively, first matter both loses the substantial form(s) of the former substance(s), which it has, and acquires the substantial form of Mr. Smith, or of this horse, or of this oak tree, as the case may be, which it previously lacked. Likewise, whenever, this apple, or this carrot, or this water becomes the flesh of Mr. Smith, or the flesh of this horse, or the wood of this oak tree, respectively, first matter both loses the substantial form(s) of the former substance(s), which it has, and acquires the substantial form of Mr. Smith, or of this horse, or of this oak tree, as the case may be, which it previously lacked. Lastly, whenever, Mr. Smith, or this horse, or this oak tree become this corpse of Mr. Smith, or these remains of that horse, or these remains of that oak tree, respectively, first matter both loses the substantial form of the former substance, which it has, and acquires the substantial form(s) of this corpse of Mr. Smith, or of these remains of that horse, or of these remains of that oak tree, as the case may be, which it previously lacked.

One question which naturally arises here is this: Why do we maintain that, in every substantial becoming of the sort just described, there is an *acquisition*, on the part of first matter, rather than an *eduction* of substantial form from the passive ability of first matter? Is what is traditionally named the "eduction" of substantial form from first matter different from what we have in mind here?

In order to answer these queries, it is necessary to understand what precisely the eduction of

form from matter involves. Here the etymology of the name provides us with some initial help. It is clear that our English word comes from the Latin terms, "*e(x)*" and "*ducere*." Hence, we can say that the terms from which the name "eduction" is formed signify "to lead out from." This is significant insofar as it helps us to see that the eduction of a form from matter involves the leading out of that form from the passive ability of the said matter. We can see from this, as well, that in order for a form to be led *out* from or educed from the ability of matter, it must be *in* the ability of that matter beforehand.

In addition to this, John of St. Thomas lays out the requirements needed both on the part of the form and on the part of the matter in order for the former to be able to be educed from the latter. He writes:

> ...in order for the eduction of form from matter to take place, three conditions are required: first, [it is necessary] that the form depend for its being and becoming upon the subject from which it is educed. Second, [it is required] that such a potency or subject be connatural and proportionate to such a form and the form to it; otherwise, [the form] will not be contained in its potency, and just as it is not contained in it, neither can it be educed from it. Third, [it is necessary] that the form not come from something extrinsic, but that it be born from the matter itself, that is, that it come to be through the transmutation of the matter by which the matter is reduced from potency to act.[3]

In order to illustrate these three requirements, we might think of the way in which the form or shape of a bowl is led out from or educed from the passive ability of clay.[4] First, it is clear that the form

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[3] ...ad educationem formae a materia, tres conditiones requiruntur: prima, quod forma pendeat in suo esse et fieri a subiecto, a quo educitur. Secunda, quod talis potentia seu subiectum sit connaturale et proportionatum tali formae et forma illi; alioquin non continebitur in eius potentia, et sic in ea non continetur nec ab illa educitur. Tertia, quod forma non veniat ab extrinseco, sed nascatur ex ipsa materia, id est per eius transmutationem fiat, qua reducitur materia de potentia in actum. *Cursus Philosophicus, Phil. Nat.*, p. 1, q. 4, a. 1, p. 85.

[4] This change which involves the coming to be of an artifact might seem initially to violate the second requirement. For, St. Thomas maintains, in his first *lectio* on Book Two of the *Physics*, that the coming to be of artifacts is not a natural change since, "licet principium materiale sit in eo quod fit, non tamen habet potentiam naturalem ad talem formam." This objection, however, is easily answered. For even if we grant that clay has no

or shape of a bowl cannot be without the clay and cannot come to be in the clay without the clay. Second, we readily see that the passive ability of clay is well proportioned to the form or shape of a bowl and that the latter form or shape is well proportioned to the passive ability of the clay. Indeed, this explains why we so often make bowls out of clay. Clay naturally holds the form or shape of a bowl well, and the latter naturally remains in the clay well. Third, it is manifest that it is through the transmutation of the clay that the clay is reduced from merely being able to have the form or shape of a bowl, to actually having such a form or shape. Hence, it seems that we can justly say that when clay is shaped into a bowl, the form or shape of the bowl is led out from or educed from the passive ability of the clay.

Now that we have an understanding of what is involved in the eduction of a form from the passive ability of its matter, it is essential to note that some substantial forms are not educed from the passive ability of first matter. That is, owing to the fact that they are subsistent substantial forms, the substantial forms of men cannot be educed from the passive ability of first matter. Speaking to this point, St. Thomas writes:

> Every form which is brought into being through the transmutation of matter, is a form educed from the potency of matter. For to transmute matter is to reduce it from potency to act. But the intellectual soul cannot be educed from the potency of matter. For it was shown above that the intellectual soul exceeds the whole potency of matter, since it has an operation apart from matter, as was shown above. Hence, the intellectual soul is not brought into being through the transmutation of matter. And, thus, neither [is it brought into being] through the action of the power which is in the sperm.[5]

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natural ability, in the strict sense of the term, for the form of a bowl, still there can be no doubt that the clay and the form of a bowl are proportionate to each other, as will be made clear below. See, as well, *De potentia*, q. 3, a. 8 *ad 5um*, vol. 2, p. 62.

[5] Omnis forma quae educitur in esse per materiae transmutationem, est forma educta de potentia materiae: hoc enim est materiam transmutari, de potentia in actum reduci. Anima autem intellectiva non potest educi de potentia materiae: iam enim supra ostensum est quod ipsa anima intellectiva excedit totum posse materiae, cum

Rather, as St. Thomas demonstrates elsewhere, it is through creation alone that the substantial form of a man is introduced into the passive ability of first matter.[6]

Why note this? Because even though it is through creation, and not eduction, that man's substantial form is introduced into the potency of first matter, we still speak of man as a substance which is generated or which comes to be. For example, when speaking of what the natural philosopher studies, Aristotle says, "he knows about things which are separable in species, but are in material, for man and the sun beget man."[7] And commenting on this, the Angelic Doctor writes:

> ...the end of the consideration of natural science is concerning forms which are indeed separate [from matter] in some way, but, nevertheless, have their being in matter. And rational souls are forms of this sort, which are separate [from matter] insofar as the intellectual power is not the act of some bodily organ, as the power of sight is the act of the eye. But they are in matter insofar as they give natural being to such a body.
>
> And he proves that they are in matter in the following way: the form of anything generated from matter is a form in matter. For generation is terminated when the form is in the matter. But man is generated from matter both by a man, as a proper agent, and by the sun, as a universal agent with respect to generable things. Hence, it follows that the soul, which is the human form, is a form in matter. Whence, the consideration of natural science concerning forms extends even to the rational soul.[8]

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habeat aliquam operationem absque materia, ut supra ostensum est. Non igitur anima intellectiva educitur in esse per transmutationem materiae. Et sic, neque per actionem virtutis quae est in semine. *SCG*, Bk. 2, ch. 86, vol. 13, p. 535. Similarly, in *De potentia*, q. 3, a. 8 *ad 7um*, vol. 2, p. 62, St. Thomas teaches: "...licet anima rationalis habeat materiam in qua sit, non tamen educitur de potentia materiae, cum eius natura supra omnem materialem ordinem elevetur: quod eius intellectualis operatio declarat. Et iterum haec forma est res per se subsistens, cum corrupto corpore, maneat."

[6] See, for example, *SCG*, Bk., 2, ch. 87, vol. 13, pp. 537-538.

[7] *Physics*, Bk. 2, ch. 2, 194b13-14.

[8] Et ideo terminus considerationis scientiae naturalis est circa formas quae quidem sunt aliquo modo separatae, sed tamen esse habent in materia. Et huiusmodi formae sunt animae rationales: quae quidem sunt separatae inquantum intellectiva virtus non est actus alicuius organi corporalis, sicut virtus visiva est actus oculi; sed in materia sunt inquantum dant esse naturale tali corpori. Et quod sint in materia, per hoc probat, quod forma cuiuslibet rei generatae ex materia est forma in materia: ad hoc enim terminatur generatio, ut forma sit in materia. Sed homo generatur ex materia et ab homine, quasi ab agente proprio, et a sole tanquam ab agente universali

Hence, we can see from this that since men come to be thanks to substantial becoming, and this without the eduction of their substantial forms from the passive ability of first matter, it would be incorrect to hold that whenever this substance of this kind becomes that substance of that kind, some substantial form is *educed* from the passive ability of first matter. Rather, we must maintain more generally, as was stated above, that, whenever this substance of this kind becomes that substance of that kind, first matter *acquires* a substantial form which it previously lacked.

Before leaving this consideration altogether, it seems appropriate to note another way in which the substantial becoming of a man (or other animal, for that matter) differs from the substantial becoming of more simple natural substances. St. Thomas sometimes refers to the latter kind of substantial becoming as "*generatio simplex*," whereas he says that the former kind of substantial becoming "*continens in se plures generationes et corruptiones*." Regarding this distinction, he teaches:

> And it must be known that the generation of a man or animal is different from the generation of air or water. For the generation of air is simple, since in the whole generation of air there are only two substantial forms, one which is thrown off and one which is acquired, [and] the whole generation comes to be in an instant. Thus, before the introduction of the form of air, the form of water always remains present; nor are any dispositions to the form of air present. In the generation of an animal, however, there are diverse substantial forms. For first there is the sperm, and afterwards the blood, and so on until there is the form of a man or an animal. And, therefore, it is necessary that a generation of this sort not be simple, but rather that it contain in itself many generations and corruptions. For it is impossible for one and the same substantial form to be gradually led out into act, as was shown above. Therefore, once the formative power which initially is in the seed has thrown off the form of the sperm, another form is acquired; [and] when this one is thrown off another is acquired again. Thus, first a vegetative soul is acquired, and when this is

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respectu generabilium: unde sequitur quod anima, quae est forma humana, sit forma in materia. Unde usque ad animam rationalem se extendit consideratio naturalis, quae est de formis. *In Phys.*, Bk. 2, *lectio* 4, vol. 2, pp. 66-67.

> thrown off a soul which is at once vegetative and sensitive is acquired. Now when this latter is thrown off, a soul which is at once rational, sensitive, and vegetative is acquired, not through the aforesaid power, but rather through God creating it. And thus it must be said, according to this opinion, that before the embryo has a rational soul, it lives and has a soul, and that when this soul is thrown off, a rational soul is acquired. And, thus, it does not follow that two souls are in the same body, nor that the rational soul is passed on with the semen.[9]

Here we see that, according to St. Thomas, the substantial becoming of a man or of an animal may in truth involve many substantial becomings. These latter serve to introduce the proper dispositions which are required by the substantial form of a man or of an animal. Further, it is only in the final one of these substantial becomings that first matter acquires the substantial form of a man or of an animal which it previously lacked. Hence, granted this, we must maintain that whenever this substance of this kind becomes that substance of that kind, first matter acquires a substantial form which it previously lacked, and this substantial becoming consists either in a *generatio simplex* or in a *generatio continens in se plures generationes et corruptiones*.

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[9] Et sciendum quod aliter est in generatione hominis vel animalis, et aliter in generatione aeris vel aquae. Nam generatio aeris est simplex, cum in tota generatione aeris non appareant nisi duae formae substantiales, una quae abiicitur et alia quae inducitur, quod totum fit simul in uno instanti: unde ante introductionem formae aeris semper manet ibi forma aquae; nec sunt ibi dispositiones ad formam aeris. In generatione autem animalis apparent diversae formae substantiales, cum primo appareat sperma, et postea sanguis, et sic deinceps quousque sit forma hominis vel animalis. Et sic oportet quod huiusmodi generatio non sit simplex, sed continens in se plures generationes et corruptiones. Non enim potest esse quod una et eadem forma substantialis gradatim educatur in actum, ut ostensum est. Sic ergo per virtutem formativam, quae a principio est in semine, abiecta forma spermatis, inducitur alia forma; qua abiecta, iterum inducatur alia: et sic primo inducatur anima vegetabilis; deinde ea abiecta, inducatur anima sensibilis et vegetabilis simul; qua abiecta, inducatur non per virtutem praedictam sed a creante, anima quae simul est rationalis sensibilis et vegetabilis. Et sic dicendum est secundum hanc opinionem quod embrio antequam habeat animam rationalem, vivit et habet animam, qua abiecta, inducitur anima rationalis. Et sic non sequitur duas animas esse in eodem corpore, nec animam rationalem traduci cum semine. *De potentia*, q. 3, a. 9 *ad 9um*, vol. 2, p. 68.

## 2. The *Principia Naturae* and Substantial Unity

Now, at this point our next task is to show that only a specific understanding of the natures of first matter, substantial form, and the privation of substantial form is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind amongst the substances involved in substantial becoming, and c) the reality of substantial becoming itself. Starting, then, with the first of these, we must show that only a specific understanding of the natures of first matter, substantial form, and the privation of substantial form is able to account for the fact that each of the natural substances involved in substantial becoming is one or "undivided in itself."[10]

In order to show this, we must keep in mind that we have already established that there are, as Charles De Koninck puts it, "a multiplicity of principles" which compose the natural substances involved in substantial becoming.[11] Attending, then, to the fact that these principles are not one but many, we can ask this question: What kinds of principles are required in order to explain the fact that the natural substances involved in substantial becoming are one or "undivided in themselves"? Addressing this question,[12] De Koninck writes:

> They must be such that the unity of the essence is saved. If the two principles were each an essence, that is, a determination, they could only make an essence double; and there would be only an accidental link between them, as between the essence and existence of the finite being as such.
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> Thus we are *constrained* to say that one of the two principles is determination

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[10] Here, as in chapter four, we are not concerned with showing that these substances in question are "divided off from others," for, in some measure or another, this fact is granted by the proponents of both *Monism* and *Pluralism*.

[11] *The Writings of Charles De Koninck*, p. 260.

[12] The actual question which De Koninck raises is this: "But on what condition can a multiplicity of principles make an essence *one*?" *Ibid.*, p. 260.

> and the other indetermination. The first expresses the identity of the mobile being, the second its receptivity vis-à-vis successive existence. This principle of indetermination must be *pure* indetermination, since any limit would make it determinate. In other words, its proper determination consists of not having one: it is pure potency.
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> These are difficult words, but unless we halt midway we must arrive at these conclusions. We call the principle of determination *form* (*morphe*), and the pure potency has the name *prime matter* (*prote hyle*): two terms which do not have much in common with their current meanings. [13]

What De Koninck manifests here is that if the essential principles of a natural substance did not stand to each other as determination to pure indetermination, or as act to pure passive ability, then the substance in question would not be one being, but rather many beings accidentally united to each other.

In his *De ente*, St. Thomas presents essentially the same consideration yet more formally and profoundly. He states:

> ...there is a great difference between substantial forms and accidental forms. For just as substantial form does not have absolute existence *per se* without that to which it comes, so too neither does that to which it comes, namely, matter. And, therefore, from the conjunction of both, there remains that existence in which the thing [i.e., the substance] subsists *per se* and from them it [i.e., the thing or substance] is made one *per se*. On account of this there remains from the conjunction of them a certain essence. Hence, although form [i.e., substantial form], considered in itself, does not have the complete nature of an essence, nevertheless, it is part of a complete essence. But that to which an accident comes is a complete being in itself subsisting in its own existence, which existence indeed naturally precedes the accident which supervenes. And, thus, the supervening accident, from its conjunction with that to which it comes does not cause that existence, in which the thing [i.e., the substance] subsists, through which the thing [i.e., the substance] is a being *per se*. Rather, it causes a certain existence without which the subsistent thing [i.e., the substance] can be understood, since what is first can be understood without what is second. Hence, [what is] from the accident and [its] subject is not made one *per se*, but one *per accidens*. And, therefore, from the conjunction of these things there does not result a certain essence,

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[13] *Ibid.*, p. 260. St. Thomas makes essentially the same point in this text: "Non enim fit simpliciter unum ex duobus actibus, sed ex potentia et actu, inquantum id quod est potentia, fit actu." *De spir. creat.*, a. 3, vol. 24, 2, p. 42. See also, *De anima*, q. 2 *ad* 11*um*, vol. 24, 1, p. 20.

> as [occurs] with the conjunction of form to matter. On account of this, an accident has neither the nature of a complete essence, nor that of part of an essence, but just as it is a being in a certain respect, so too it has an essence in a certain respect.[14]

If we take it as having been established above that the *per se* principles of the natural substances involved in substantial becoming must stand to each other as form to matter, then we can read this text as laying out the two fundamental ways in which one might attempt to explain the substantial unity of these same natural substances. That is, either substantial form and first matter must account for the substantial unity of the natural substances involved in substantial becoming or accidental form and substance must account for their substantial unity.[15]

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[14] Sed tamen inter formas substantiales et accidentales tantum interest, quia sicut forma substantialis non habet per se esse absolutum sine eo cui advenit, ita nec illud cui advenit, scilicet materia. Et ideo ex coniunctione utriusque relinquitur illud esse, in quo res per se subsistit, et ex eis efficitur unum per se; propter quod ex coniunctione eorum relinquitur essentia quaedam. Unde forma, quamvis in se considerata non habeat completam rationem essentiae, tamen est pars essentiae completae. Sed illud, cui advenit accidens, est ens in se completum, subsistens in suo esse. Quod quidem esse naturaliter praecedit accidens quod supervenit. Et ideo accidens superveniens ex coniunctione sui cum eo cui advenit non causat illud esse, in quo res subsistit, per quod res est ens per se, sed causat quoddam esse secundum, sine quo res subsistens intelligi potest esse, sicut primum potest intelligi sine secundo. Unde ex accidente et subiecto non efficitur unum per se, sed unum per accidens. Et ideo ex eorum coniunctione non resultat essentia quaedam, sicut ex coniunctione formae ad materiam. Propter quod accidens neque rationem completae essentiae habet neque pars essentiae completae est, sed sicut est ens secundum quid, ita et essentiam secundum quid habet. *De ente*, ch. 6, vol. 43, p. 380.

[15] This is not to deny what St. Thomas explicitly states in numerous texts, namely, that we can speak of a substance as being composed of a substantial form and a body of some sort (see, for example, *SCG*, Bk. 2, ch. 71, vol. 13, pp. 454 quoted below as well as *De spir. creat.*, a. 3 *ad* 10*um*, vol. 24, 4, p. 46). One notable text is the following one from chapter two of the *De ente*, vol. 43, p. 372: "Et ex hoc patet ratio quare genus et species et differentia se habeant proportionaliter ad materiam, formam, et compositum in natura, quamvis non sint idem cum illis; quia neque genus est materia, sed sumitur a materia significans totum: nec differentia est forma, sed sumitur a forma ut significans totum; unde dicimus hominem esse animal rationale, et non ex animali et rationali, sicut dicimus eum esse ex corpore et anima. Ex corpore enim et anima dicitur esse homo, sicut ex duabus rebus quaedam tertia res constituta, quae neutra illarum est: homo enim nec est anima neque corpus: sed si homo aliquo modo ex animali et rationali dicatur esse, non erit sicut res tertia ex duabus rebus, sed sicut intellectus tertius ex duobus intellectibus."

In his commentary on this text, Cajetan has the following to say: "Advertendum est quod S. Thomas in textu explanando majorem, exemplariter dicit, quod homo dicitur esse ex anima et corpore, sicut ex duabus rebus tertia res. Circa quae verba dubitatur quomodo hoc sit verum, ejus doctrinam sustinendo ponentis unicam formam substantialem in composito: quaecunque enim sunt idem realiter, non constituunt aliquod, ut duae res tertiam: perfectio autem corporea et anima sunt idem realiter, si unica forma ponitur, quomodo ergo constituent hominem, ut duae res tertiam?" After giving several possible ways of reading St. Thomas's text, Cajetan provides us with what he takes to be the most reasonable reading. He writes: "Mihi autem pro nunc videtur dicendum, quod homo est compositum ex anima et corpore, non solum tamquam ex duabus rebus tertia res: sed tamquam ex duabus partibus secundum rem totum, accipiendo animam praecise, ut diffinitur II de Anima. Significat autem corpus sic acceptum

To begin with the second of these options first, it is not difficult to see that accidental form and substance are incapable of accounting for substantial unity. For, as the proponents of *Monism* and *Pluralism* themselves grant, rather than accounting for the unity of natural substances, the union of accidental form and substance presupposes the existence of such a unity already. For example, if the art of music is to be united to a man, the man in question is already understood to be one substance (i.e., the kind which makes him able to acquire the art of music). Likewise, if the accidental form of order is to be added to many men in order to make them into a basketball team, each of these men must already be one substance (i.e., the kind that is able to be a member of the team). Hence, we can say that accidental form and substance are incapable of accounting for substantial unity, since the union of these principles presupposes, rather than causes, this sort of unity. Thus, with St. Thomas, we can conclude that, "[what is] from the accident and [its] subject is not made one *per se*, but one *per accidens.*"

In the first part of his text, by contrast, St. Thomas shows us that only substantial form and first matter can account for the unity or undividedness of natural substances. We can see why this is so if we attend to the fact that, as St. Thomas says, "just as substantial form does not have absolute existence *per se* without that to which it comes, so too neither does that to which it comes, namely, matter." In other words, neither substantial form nor first matter has through itself the existence

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compositum ex materia et perfectione corporea praecise. Anima vero perfectionem vitalem praecise. Probatur intentum sic: corpus differt realiter ab anima, et non ut totum a parte, ergo ut pars a parte. Probatur media: quia totum confuse saltem includit partem, corpus autem sic acceptum excludit animam: unde in diffinitione animae ponitur corpus, et subjectum deferens animam, ut ibi dicit S. Thomas. Prima propositio est ex se evidens, et ab omnibus concessa. Consequentia autem ex sufficienti divisione robur trahit: oportet enim vel ut totum a parte, vel ut pars a parte, corpus realiter differre ab anima, si realiter differunt: homo igitur est compositus ex corpore et anima tamquam ex partibus realiter distinctis: quod erat intentum. Et adverte quod corpus, pars cum importat corporeitatem praecise extra ipsam, est identitas perfectionis corporeae ad animam seu perfectionem vitalem: accidit enim, accidente extraneo corpori praecise, quod ejus perfectio sit idem cum anima: per se enim praescindit animam, et ideo per se loquendo subtiliter dictum est hominem componi realiter ex anima et corpore." *Commentaria in De Ente et Essentia*, pp. 425-426.

which is proper to substance. Rather, each has a kind of incomplete existence through itself. Because of this, as St. Thomas says, "from the conjunction of both, there remains that existence in which the thing [i.e., the substance] subsists *per se* and from them it [i.e., the thing or substance] is made one *per se*." In other words, it is owing to the incomplete existence which substantial form and first matter have through themselves that the union of these principles results in nothing more than that which has an absolute and complete existence through itself, namely, a natural substance with a composed essence.[16]

Now in addition to being without "absolute existence *per se*," substantial form and first matter stand to each other as form to matter or as act to passive ability. Indeed, it is because they stand to each other in this way that substantial form and first matter are immediately united to each other.[17] Helping us to unfold this truth, Fr. Gredt argues as follows:

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[16] Regarding this point, Fr. Francis McMahon writes: "A house as such is not made up of little houses, the familiar saying goes. Neither is a composed being constituted of beings. But the objection immediately arises: these principles either exist or they do not. If they exist, they are being *tout court*; if they do not exist, they cannot be the components of real being. I remember one philosopher who believed he had once and for all disposed of hylomorphism by arguing that matter and form were two zeros equaling one.

"But the point is that a principle of being has reality and significance only in union with its co-principle. Isolate it – if you could – from the latter, and it ceases to be and to be thought of. By itself it is nothing. That much can be admitted to the adversary. But there is precisely the root of his difficulty. A principle of being is not something that first exists in its own right, and to which is then added a relation to another principle. Its whole reality consists in this relation. There are realities which have by themselves a subsistent character, but there are other realities essentially relative, in the depths of whose very nature there is a demand for union with another.... If there is difficulty in grasping them, it is because the intellect must penetrate, in a manner, beneath its proper object – which is being – and unearth the conditions which make finite being intrinsically intelligible. The intellect, moreover, can easily be led astray by the imagination, and what can the imagination make of principles of being?" Quoted from his, "Being and Principles of Being," *The New Scholasticism* 17 (1943), pp. 323-324. On this matter, see *De potentia*, q. 3, a. 8, vol. 2, pp. 61-62.

[17] Regarding this, St. Thomas teaches: "Forma autem unitur materiae absque omni medio: per se enim competit formae quod sit actus talis corporis, et non per aliquid aliud. Unde nec est aliquid unum faciens ex materia et forma nisi agens, quod potentiam reducit ad actum, ut probat Aristoteles, in VIII Metaphysicae: nam materia et forma habent se ut potentia et actus." *SCG*, Bk. 2, ch. 71, vol. 13, p. 454. The text from the *Metaphysics* that St. Thomas has in mind is found in chapter four of the eighth book (1045b16-24). It reads: "...people look for a unifying formula, and a difference, between potency and complete reality. But, as has been said, the proximate matter and the form are one and the same thing, the one potentially, and the other actually. Therefore it is like asking what in general is the cause of unity and of a thing's being one; for each thing is a unity, and the potential and the

Whatever things by their very entity immediately exercise causality on each other through the mode of parts are immediately united to each other formally. But matter and form by their very entity immediately exercise causality on each other through the mode of parts. Therefore, [matter and form are immediately united to each other formally.]

The major is clear: Whatever things are parts are united; whatever things are parts such that by their very entity they immediately exercise causality on each other are immediately united to each other formally.

Proof of the minor: It is plain from the very essence of matter and form that matter and form are constituent parts of the whole or of the complete substance. That matter and form by their very entity immediately exercise causality on each other is proved thus: form exercises causality in matter insofar as it actuates matter, and matter in form insofar as it receives and sustains it. But form by its very entity immediately actuates matter, and matter by its very entity immediately receives and sustains form. For form by its essence is the act of matter and the unfolding of it, and matter by its essence is the ability sustaining form. For this is a difference between

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actual are somehow one. Therefore there is no other cause here unless there is something which caused the movement from potency to actuality. And all things which have no matter are without qualification essentially unities." This translation is taken from Richard McKeon's *The Basic Works of Aristotle*, pp. 791-792. Regarding this text, St. Thomas comments as follows: "Deinde cum dicit causa vero assignat causas erroris praedictorum; dicens, quod causa quare talia posuerunt, est, quia inquirebant quid faciens unum potentiam et actum, et inquirebant differentias eorum, quasi oporteret eas colligari per aliquod unum medium, sicut ea quae sunt diversa secundum actum. Sed sicut dictum est, ultima materia, quae scilicet est appropriata ad formam, et ipsa forma, sunt idem. Aliud enim eorum est sicut potentia, aliud sicut actus. Unde simile est quaerere quae est causa alicuius rei, et quae est causa quod illa res sit una; quia unumquodque inquantum est, unum est, et potentia et actus quodammodo unum sunt. Quod enim est in potentia, fit in actu. Et sic non oportet ea uniri per aliquod vinculum, sicut ea quae sunt penitus diversa. Unde nulla causa est faciens unum ea quae sunt composita ex materia et forma, nisi quod movet potentiam in actum. Sed illa quae non habent materiam simpliciter, per seipsa sunt aliquid unum, sicut aliquid existens." *In Metaphys.*, Bk. 8, *lectio* 5, p. 510 (#1767).

When St. Thomas states that it belongs to substantial form to be the act of "such of body," we must understand the body to be what it is through the substantial form which it receives. Here it is worth noting both the first objection and its reply in *ST* I, q. 76, a. 4, vol. 5, pp. 223-224. The objection is: "Videtur quod in homine sit alia forma praeter animam intellectivam. Dicit enim philosophus, in II de anima, quod anima est actus corporis physici potentia vitam habentis. Comparatur igitur anima ad corpus, sicut forma ad materiam. Sed corpus habet aliquam formam substantialem per quam est corpus. Ergo ante animam praecedit in corpore aliqua forma substantialis."

And the reply is: "Ad primum ergo dicendum quod Aristoteles non dicit animam esse actum corporis tantum, sed actum corporis physici organici potentia vitam habentis, et quod talis potentia non abiicit animam. Unde manifestum est quod in eo cuius anima dicitur actus, etiam anima includitur; eo modo loquendi quo dicitur quod calor est actus calidi, et lumen est actus lucidi; non quod seorsum sit lucidum sine luce, sed quia est lucidum per lucem. Et similiter dicitur quod anima est actus corporis etc., quia per animam et est corpus, et est organicum, et est potentia vitam habens. Sed actus primus dicitur in potentia respectu actus secundi, qui est operatio. Talis enim potentia est non abiiciens, idest non excludens, animam." St. Thomas fills out what he says here in the following parallel text: "dicendum quod in definitionibus formarum aliquando ponitur subiectum ut informe, sicut cum dicitur 'motus est actus existentis in potentia'. Aliquando autem ponitur subiectum formatum, ut cum dicitur 'motus est actus mobilis' et 'lumen est actus lucidi'. Et hoc modo dicitur anima actus corporis organici physici, quia anima facit ipsum esse corpus organicum, sicut lumen facit aliquid esse lucidum." *De anima*, q. 1 *ad* 15*um*, vol. 24, 1, p. 12.

> intrinsic causes (matter and form) and extrinsic causes (agent and end), namely, that the latter cause through the mediation of some middle (such that the agent causes through the mediation of power and action), but the former [cause] by their very entity immediately. Therefore, [matter and form by their very entity immediately exercise causality on each other through the mode of parts.][18]

From this text we see that it is owing to their very natures as that by which matter is actualized in some way and as that which sustains or underlies form that form and matter, respectively, must be said to exercise causality immediately on each other by their very entity.[19] But it is also clear that matter and form are, from their very essences, constituent parts of the whole which they compose. Hence, it follows that "matter and form by their very entity immediately exercise causality on each other through the mode of parts." But, as Fr. Gredt manifests, whatever things immediately exercise

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[18] (Materia et forma immediate seipsis uniuntur formaliter). – Seipsis immediate uniuntur formaliter, quae sua ipsius entitate immediate ad invicem causalitatem exercent per modum partium. Atqui materia et forma sua ipsius entitate immediate ad invicem causalitatem exercent per modum partium. Ergo.

"*Mai.* patet: Quae partes sunt, uniuntur; quae partes sunt ita, ut sua ipsius entitate immediate ad invicem causalitatem exerceant, immediate formaliter uniuntur.

"*Ad min.* Materiam et formam esse partes constituentes totum seu substantiam completam, ex ipsa essentia patet materiae et formae; materiam et formam ad invicem causalitatem exercere immediate sua ipsius entitate probatur: Forma causalitatem exercet in materiam, quatenus actuat materiam, materia in formam, quatenus eam recipit et sustentat. Atqui forma immediate sua ipsius entitate actuat materiam, et materia immediate sua ipsius entitate recipit et sustentat formam. Forma enim per essentiam suam est actus materiae seu evolutio eius, et materia per essentiam suam est potentia sustentativa formae. Nam haec est differentia inter causas intrinsecas (materiam et formam) et causas extrinsecas (efficientem et finalem), quod hae causant mediante aliquo medio (ita efficiens causat mediante virtute et actione), illae vero immediate sua ipsius entitate. Ergo. *Elementa Philosophiae Aristotelico-Thomisticae*, vol. 1, #264, p. 223.

Later in his text, Fr. Gredt raises an objection against this argument which is worth including here, together with his reply to it. He writes: "Quae uniuntur formaliter mediante causalitate, non uniuntur seipsis. Atqui materia et forma formaliter uniuntur mediante causalitate. Ergo. – *Resp. Dist. mai.*: Si causalitatem non exercent sua ipsius entitate, *conc.*; si causalitatem exercent sua ipsius entitate, *nego. Contradist. min.*" *Ibid.*, p. 224.

[19] The following texts from St. Thomas help to make these points clear: "...actus ad quem est in potentia materia prima, est substantialis forma. Et ideo potentia materiae non est aliud quam eius essentia." *ST* I, q. 77, a. 1 *ad 2um*, vol. 5, p. 237. And: "Est...quaedam perfectio prima ut forma substantialis, subjectum cujus est in potentia tantum, scilicet materia prima quae sicut est ens incompletum et in potentia..." *In Sent.*, Bk. 2, d. 34, q. 1, a. 4, vol. 2, p. 884. And finally: "Omne...quod est actu: vel est ipse actus, vel est potentia participans actum. Esse autem actu repugnat rationi materiae, quae secundum propriam rationem est ens in potentia. Relinquitur ergo quod non possit esse in actu nisi in quantum participat actum. Actus autem participatus a materia nihil est aliud quam forma; unde idem est dictu, materiam esse in actu, et materiam habere formam. Dicere ergo quod materia sit in actu sine forma, est dicere contradictoria esse simul; unde a Deo fieri non potest." *Quod.*, III, q. 1, a. 1, vol. 25, 2, p. 242.

causality on each other in this way are immediately united to each other formally (i.e., in terms of what they are). Hence, it is necessary that matter and form are immediately united to each other formally (i.e., in terms of what they are).

At this point, then, it is clear that only substantial form and first matter can account for the unity or undividedness of the natural substances involved in substantial becoming. For, in contrast to accidental form and substance, substantial form and first matter constitute nothing more than a natural substance, and this on account of the incomplete existence which they have through themselves. Furthermore, we have seen that substantial form stands to first matter as act stands to passive ability and, thus, these principles are united to each other without any intermediary. Hence, it is from these two inward principles alone that every substance which they constitute is one or undivided in its nature.

Having established these things, however, one might still wonder whether the substantial unity of natural substances is to be attributed more to the nature of first matter, more to the nature of substantial form, or equally to the natures of both of these principles. In the following text from the *SCG*, St. Thomas gives us some direction in this matter. He maintains:

> In order that something be a substantial form of another, two things are required. One of these things is that the form be the principle of existing substantially to that of which it is the form. However, I am speaking, not of a productive principle [i.e., an agent cause], but of a formal principle by which something is and is denominated a "being." Whence, the other [requirement] follows from this, namely, that form and matter agree in one existence, which does not happen with the effective principle and that to which it gives existence. And this existence is that in which the composite substance, which is one according to existence and constituted from matter and form, subsists.[20]

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[20] Ad hoc enim quod aliquid sit forma substantialis alterius, duo requiruntur. Quorum unum est, ut forma sit principium essendi substantialiter ei cuius est forma: principium autem dico, non factivum, sed formale, quo aliquid est et denominatur ens. Unde sequitur aliud, scilicet quod forma et materia conveniant in uno esse: quod non

What this text elucidates is that just as it is from its substantial form that a substance is and is called a "being," so too it is from its substantial form that a natural substance is one and is called "undivided in itself" or "one." For it is in virtue of its substantial form that a given natural substance has its singular substantial existence whereby it is or, better, subsists.

In his *De spir. creat.*, St. Thomas is more explicit on this matter and even calls substantial form the "*ratio unitatis*" in a substance. He writes:

> If it be posited that the soul is united to the body as a form, then it is necessary to say that it is united to it immediately. For every form, either substantial or accidental, is united to matter or to a subject. For anything is one to the extent that it is a being. But anything is a being in act through form, either according to substantial existence or according to accidental existence. Hence, every form is an act and, consequently, [every form is] the cause of unity in virtue of which something is one. Therefore, just as it is not to be said that there is some medium by which matter has existence through its form, so too it cannot be said that there is some medium uniting form to matter or to its subject. Therefore, insofar as the soul is the form of the body, there cannot be some medium between the soul and the body. [21]

Here St. Thomas states that substantial unity follows upon substantial existence. Or, more generally, everything is one to the extent that it is a being. But every natural substance has the existence proper

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contingit de principio effectivo cum eo cui dat esse. Et hoc esse est in quo subsistit substantia composita, quae est una secundum esse, ex materia et forma constans. *SCG*, Bk. 2, ch. 68, vol. 13, p. 440.

[21] Si vero ponatur anima uniri corpori ut forma, necesse est dicere, quod uniatur ei immediate. Omnis enim forma sive substantialis sive accidentalis, unitur materiae vel subiecto. Unumquodque enim secundum hoc est unum, secundum quod est ens. Est autem unumquodque ens actu per formam, sive secundum esse substantiale, sive secundum esse accidentale: unde omnis forma est actus; et per consequens est ratio unitatis, qua aliquid est unum. Sicut igitur non est dicere quod sit aliquod aliud medium quo materia habeat esse per suam formam, ita non potest dici quod sit aliquod aliud medium uniens formam materiae vel subiecto. Secundum igitur quod anima est forma corporis, non potest esse aliquid medium inter animam et corpus. *De spir., creat.*, a. 3.

St. Thomas presents essentially the same argument in the *Prima pars* as well. There he writes: "Si vero anima unitur corpori ut forma, sicut iam dictum est, impossibile est quod uniatur ei aliquo corpore mediante. Cuius ratio est, quia sic dicitur aliquid unum, quomodo et ens. Forma autem per seipsam facit rem esse in actu, cum per essentiam suam sit actus; nec dat esse per aliquod medium. Unde unitas rei compositae ex materia et forma est per ipsam formam, quae secundum seipsam unitur materiae ut actus eius. Nec est aliquid aliud uniens nisi agens, quod facit materiam esse in actu, ut dicitur in VIII Metaphys." *ST* I, q. 76, a. 7, vol. 5, p. 231.

to it in virtue of its substantial form. For it is in virtue of its substantial form that a natural substance has its substantial existence and thereby is made to be simply speaking. Hence, it follows that every natural substance has its essential undividedness or substantial unity in virtue of its substantial form (or, to use St. Thomas' name, its *ratio unitatis*).

In addition to this, St. Thomas teaches that, owing to the kind of substantial forms that they have, certain kinds of natural substances can be said to be more undivided or more one than others. Concerning this, he says:

> The lowest part of the higher genus is always found to coincide with the highest part of the lower genus, just as the lowest things in the genus of animals barely exceeds the life of plants. For example, oysters, which are immobile, only have the sense of touch and are bound to the earth as are plants. Hence, Blessed Dionysius says in chapter seven of *On Divine Names* that divine wisdom joins together the ends of superior things with the beginnings of inferior things. It is to be understood, then, that what is supreme in the genus of bodies, namely the human body, proportionately put together, attains to the lowest of the higher genus, namely to the human soul, which holds the lowest place in the genus of intellectual substances as can be perceived from our mode of understanding. And, thus, the intellectual soul is said to be like a certain horizon and boundary of corporeal things and incorporeal things insofar as it is an incorporeal substance which is also the form of a body. But something [constituted] from an intellectual substance and bodily matter is not less one than something [constituted] from the form of fire and its matter, but perhaps more one. For to the extent that form conquers matter, what is made from that form and matter is more one [*quanto forma magis vincit materiam, ex ea et materia efficitur magis unum*].[22]

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[22] Semper enim invenitur infimum supremi generis contingere supremum inferioris generis: sicut quaedam infima in genere animalium parum excedunt vitam plantarum, sicut ostrea, quae sunt immobilia, et solum tactum habent, et terrae in modum plantarum adstringuntur; unde et beatus Dionysius dicit, in VII cap. de Div. Nom., quod divina sapientia coniungit fines superiorum principiis inferiorum. Est igitur accipere aliquid supremum in genere corporum, scilicet corpus humanum aequaliter complexionatum, quod attingit ad infimum superioris generis, scilicet ad animam humanam, quae tenet ultimum gradum in genere intellectualium substantiarum, ut ex modo intelligendi percipi potest. Et inde est quod anima intellectualis dicitur esse quasi quidam horizon et confinium corporeorum et incorporeorum, inquantum est substantia incorporea, corporis tamen forma. Non autem minus est aliquid unum ex substantia intellectuali et materia corporali quam ex forma ignis et eius materia, sed forte magis: quia quanto forma magis vincit materiam, ex ea et materia efficitur magis unum. *SCG*, Bk. 2, ch. 68, vol. 13, pp. 440-441. Regarding St. Thomas's apparent hesitation in definitively concluding that man is more one than other natural substances, Sylvester of Ferrara writes: "Loquitur autem dubitative, quia non refert ad eius propositum quid horum dicatur: an scilicet magis fiat unum ex illis, an non fiat magis unum. Quomodo autem possit magis fieri

In the final sentence of this text we see St. Thomas set forth the reason for this position. That is, through their substantial forms, certain kinds of natural substances are more undivided or more one than others precisely because their substantial forms more perfectly "conquer" first matter. Yet how do some substantial forms more perfectly "conquer" first matter than others? It seems that the answer must be found in the fact that some substantial forms more perfectly or more fully actualize first matter than do others. Indeed, this way of answering the question fits well with the view of Sylvester of Ferrara.

In an attempt to elucidate St. Thomas's text, Sylvester begins by distinguishing two kinds of simplicity, namely, bodily simplicity and formal or actual simplicity.[23] Speaking in terms of bodily simplicity, something is altogether simple if it is not composed of other bodies, and one thing is said to be more simple than another if it is composed of fewer bodies than the other. In this way, the elements are more simple than mixed bodies. Now, speaking in terms of formal simplicity, something is altogether simple if it is only form and act, and one thing is said to be more simple than another to the extent that it is more formal and actual and has less potentiality. In this way, God is more simple than angels. With this distinction in mind, Sylvester proceeds with the following argument:

> ...since the foundation of composition is act and potency, since something one simply speaking does not come to be from many things unless one of them is act and the other is potency; and composition principally depends on potency since pure potency cannot exist through itself, [it follows that] insofar as potentiality and the diversity of potency from act under one existence is preserved, to that extent the

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unum ex anima et materia, ostensum est superius in Primo, cap. xviii, in quinta ratione." *Commentaria Ferrariensis*, *SCG*, Bk. 2, ch. 68, vol. 13, p. 445.

[23] *Commentaria Ferrariensis*, *SCG*, Bk. 2, ch. 18, vol. 12, p. 50.

> account of composition is preserved. For a composition of many, namely act and potency, implies an order to one existence. Therefore, wherever potentiality and the distinction [of potency and act] with a unity of existence is more fully preserved, there composition is more fully preserved. But in a composite potentiality and the distinction of potency and act is more fully preserved to the extent that the potency [of first matter] is less actualized by form and form predominates less over matter. For, then, what comes to be from them [i.e., from form and matter] is less one, since the one [i.e., matter] is drawn less to the level of the other [i.e., form]. It follows, therefore, that wherever form dominates matter less over matter, there is more potential and also more of a composite. And from this is follows that wherever there comes to be a more perfect form predominating more over matter, there will come to be from that form and matter something less composite and more one and simple, since, insofar as form predominates, it more perfectly actualizes matter and leaves it less in potency.[24]

So, although some natural substances (e.g., men, brute animals, and plants) are less simple and more composite than many other natural substances if we look at them from the point of view of bodily simplicity (for they are composed of many lower bodies), nonetheless, they are more simple, less composite and more one or undivided than many other natural substances, if we view them in terms of formal simplicity. For, as we saw to some extent in chapter six and as we shall see more distinctly below, the substantial forms of these higher natural substances more perfectly or more fully actualize first matter and, thus, leave it less in potency than the substantial forms of lower

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[24] ...cum fundamentum compositionis sit actus et potentiae, quia ex multis non fit unum simpliciter unum eorum sit actus aliud vero potentia; et ex potentia potissimum depedeat compositio, eo quod pura potentia per se esse non possit: quanto magis salvatur potentialitatis et diversitas potentiae ab actu, sub uno tamen esse, tanto magis salvatur ratio compositionis. Importat enim compositio plurium, actus scilicet et potentiae, positionem ad esse unius. Ideo ubi magis salvatur potentialitatis et distinctio cum unitate esse, ibi magis salvatur compositio. Salvatur autem in composito tanto magis distinctio potentiae et actus et potentialitatis, quanto potentia minus actuatur a forma et forma minus praedominatur materiae: quia tunc ex illis minus fit unum, dum unum minus ad gradum alterius trahitur. Sequitur ergo quod, ubi forma minus dominatur materiae, illud magis potentiale est magisque compositum. Ex hoc ulterius sequitur quod, ubi forma fuerit perfectior et magis materiae praedominans, tanto ex illa forma et materia fit aliquid minus compositum, et magis unum magisque simplex: quia forma, quanto magis predominatur, tanto perfectius actuat materiam et minus relinquit in potentia. *Ibid.*, p. 50. Related to this, St. Thomas also says, "...quanto forma est nobilior, tanto magis dominatur materiae corporali, et minus ei immergitur, et magis sua operatione vel virtute excedit eam." *ST* I, q. 76, a. 1, vol. 5, p. 210.

natural substances.[25] Or, to put this in terms of the appetite of first matter spoken of above, we can say that certain higher natural substances are more undivided or more one than others precisely because their substantial forms give a higher kind of substantial existence to first matter, and, thereby, more fully satisfy its appetite.

Now this consideration should cause us to recall something which we set forth back in chapter four. There we made the case that the substantial unity of ourselves and of our fellow men is more known to us than that of familiar higher animals, and that the substantial unity of the latter is more known to us that than of plants, and that the substantial unity of plants is more known to us than that of non-living natural substances. But here we see that men are in fact more undivided or one than animals, and that the latter are indeed more undivided or one than plants, and that plants are in fact more undivided or one than non-living natural substances. For here we see that the substantial forms of men conquer the passive ability of first matter more perfectly than do the substantial forms of animals, that the substantial forms of the latter conquer the passive ability of first matter more perfectly than to the substantial forms of plants, and that the substantial forms of the latter conquer this same passive ability more perfectly than do the substantial forms of non-living natural substances.

From these consideration, then, it is clear that the substantial unity of the substances involved in substantial becoming can only be adequately accounted for through a specific understanding of the natures of first matter, substantial form, and the privation of substantial form,

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[25] Sylvester of Ferrara does add the following note which fits well with what we shall argue in the next section of this chapter: "...advertendum quod, licet quanto aliquid est perfectius et nobilius, tanto minus habeat de potentialitate et diversitate reali, magis tamen habet de pluralitate virtuali, dum plures perfectiones continet unite et simpliciter quae in aliis sunt distinctae." *Ibid.*, p. 50.

and principally through a specific understanding of the natures of the *per se* principles and causes.[26]

### 3. The *Principia Naturae* and the Differences in Kind Between the Substances Involved in Substantial Becoming

Next, we must show that only a specific understanding of the natures of first matter, substantial form, and the privation of substantial form is able to give an adequate account of the differences in kind between the substances involved in substantial becoming. Now when we speak of "the substances involved in substantial becoming," we have in mind most specifically the substance to which the substantial becoming is attributed (e.g., that man), on the one hand, and the substance at which the substantial becoming terminates (e.g., this corpse of a man), on the other hand. Hence, we shall here show that the only adequate account of the difference in kind between the substance to which the substantial becoming is attributed and the substance at which the substantial becoming terminates is an account which is made in terms of a specific understanding of the natures of first matter, substantial form, and the privation of substantial form.

In order to see that this is so, we must recall something established in chapter six. There we established that matter and form are the *per se* principles and causes of every becoming. Hence, we must maintain that first matter and substantial form are the *per se* principles and causes of every substantial becoming. Now here we are observing that the substance to which the substantial

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[26] One might wonder quite legitimately how a specific understanding of the privation of substantial form plays any role here in adequately accounting for the substantial unity of the substances involved in substantial becoming. The proper response seems to be that just as the privation of substantial form can be termed a "*per accidens causa essendi*," as we observed in the last chapter, so too this principle can be seen to be a *per accidens causa unitatis*. Thus, while it is false to say that the privation of substantial form is a *per se* cause of the substantial unity of the substances involved in substantial becoming, it is true to say that it is a *per accidens* cause of the substantial unity of these same substances.

becoming is attributed becomes the substance at which the substantial becoming terminates. Thinking, then, in terms of the *per se* principles and causes involved, we see that first matter loses the substantial form of the substance to which the substantial becoming is attributed and acquires the substantial form of the substance at which the substantial becoming terminates. And from this it is evident that both the substance to which the substantial becoming is attributed and the substance at which the substantial becoming terminates have the same first matter as one of their *per se* principles and causes.

Now, since, on the part of their essences, these same substances are nothing other than composites of first matter and substantial form,[27] it must be the case that the difference in kind

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[27] Here we are still abstracting from the consideration of whether the substances involved in substantial becoming are elements or mixed bodies. In other words, we are still considering natural substances precisely as such. Regarding the different sorts of composition which belong to elements and mixed bodies, respectively, Joseph Bobik writes: "An element itself is not, cannot be, composed out of elements, i.e., out of prior bodily ingredients; for an element itself is the most primitive, the most simple, of all bodily ingredients. But being a substance which can come to be and cease to be in substantial change, an element must be composed out of prime matter and substantial form. Indeed, an element is the **only** physical substance which is composed **only** out of prime matter and substantial form. Unlike a mixed body – i.e., a physical thing which is composed **out of elements**, as well as out of prime matter and substantial form, e.g., wood, water, flesh, bones, sticks, stones; and, one might add, molecules, atoms, protons, neutrons, indeed all hadrons – an element itself cannot be resolved **by alteration** into bodies which are more simple than itself. There are no bodies which are more simple than an element. Only prime matter and substantial form -- and these are not bodies – are more simple than an element. All other bodies – and these are mixed bodies – are composed **both** out of elements (i.e., they can be resolved **by alteration** into bodies which are more simple than they are, and ultimately into elements) **and** out of prime matter and substantial form (because they can come to be and cease to be in substantial change)."

"With respect to the...question, that is: Can a physical substance be composed out of elements, without also being composed out of prime matter and substantial form?, it seems that it cannot. For, if it could, then certain changes which are in fact substantial changes – like the change in which sperm and ovum become a human being, or the change in which food becomes part of a human body – could not be substantial changes (rather, only accidental changes). Or, to put this another way, certain things which are in fact substances – e.g., mixed bodies like men and dogs and horses – could not be substances (rather, only accidental collections, or aggregates, of elements). That is, they would differ from one another not substantially, but only accidentally. The elements out of which they are composed would be genuine substances, but they themselves (i.e., the entities so composed) would differ from one another only by reason of the **number** and the **kind** of their ingredient elements, and by reason of the **way** in which these ingredient elements were put together. They would differ from one another, by way of comparison, in the way in which **this house** differs from **that house**, e.g., by reason of the **number** (e.g., **1800** for this one, **2000** for that one) and the **kind** (e.g., **pine** for this one, **oak** for that one) of the pieces of wood out of which each has been made, and by reason of the **way** (e.g.., **plan A** for this one, **plan B** for that one) in which these pieces of wood have been put together. And these differences are, all of them, only accidental (predicamental) differences. From his, *Aquinas on Matter and Form and the Elements*, pp. 130-131. See also, *De veritate*, q. 16, a. 1 *ad* 16*um*, vol. 22, p. 507.

between them is accounted for either by some difference(s) found in their respective first matters, or by some difference(s) found in their respective substantial forms, or by some difference(s) found in both of these principles. Since, however, the first matter is the same in both the substance to which the substantial becoming is attributed and the substance at which the substantial becoming terminates, it is impossible for this first matter to be the principle of the difference in kind between these two substances. So also, then, is it impossible for this difference in kind to be explained by some difference(s) found in both the first matters of these substances and in their substantial forms. Hence, it must be the case that the difference in kind between the substance to which substantial becoming is attributed and the substance at which the substantial becoming terminates is due to some difference(s) found in their respective substantial forms. From this line of reasoning, then, we can see more distinctly than we saw in chapter six that substantial form causes first matter not only to be a substance, but also to be a substance of this or that kind.[28]

Granted, then, what has just been established, we might still wonder about the way(s) in which one substantial form can differ from another. Addressing this query in a general way, St. Thomas holds the following:

> Furthermore, it must be known that when speaking of the intrinsic principles, namely matter and form, insofar as there is a coming together or difference among the things principled, there is a coming together or difference among the principles [themselves]. For some things are the same in number, as Sortes and "this man," when Sortes is pointed out. Some are different in number and the same in species, as Sortes and Plato, who, although they come together in the human species, nevertheless, are different in number. And some differ in species but are the same in genus, just as man and ass come together in the genus animal. But some are diverse in genus but are the same only according to analogy, as is the case with

[28] Thus, St. Thomas says that it is in virtue of its substantial form that a body and all of its parts have their "esse substantiale et specificum." See, for example, *In Sent.*, Bk. 2, d. 17, q. 2, a. 2, vol. 2, p. 432; *De anima*, q. 9, vol. 24, 1, p. 82; and *De spir. creat.*, a. 4, vol. 24, 2, p. 52.

> substance and quantity, which do not come together in some genus, but come together only according to analogy. For they come together only in being, but being is not a genus, since it is not predicated univocally, but analogously.... Therefore, with those things that are the same in number, form and matter are the same in number, as Tully and Cicero. But with those which are the same in species and different in number, the matter and form are not the same in number, but in species, as with Sortes and Plato. And, similarly, with those things that are the same in genus, their principles are the same in genus, as the soul and body of an ass and horse differ in species, but are the same in genus. And, similarly, with those things which agree only according to analogy, their principles are the same only according to analogy or proportion. For matter and form and privation, or potency and act, are the principles of substance and of the other genera. Nevertheless, the matter of substance and of quantity, and similarly the form and privation, differ in genus but agree only according to proportion. For just as the matter of substance stands to substance in the account of matter, so does the matter of quantity stand to quantity. But just as substance is the cause of the others [i.e., the other modes of being], so too the principles of substance are the principles of all of the others.[29]

Here St. Thomas makes it clear that we can judge forms to be the same or different insofar as the things principled by them are the same or different. Thus, since the things principled by forms can be the same or different in number, species, or genus (and if they differ in genus, then they are the same only according to analogy), forms themselves can be said to be the same or different in

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[29] Sciendum est etiam quod loquendo de principiis intrinsecis, scilicet materia et forma, secundum convenientiam principiatorum et differentiam est convenientia et differentia principiorum: quaedam enim sunt idem numero, sicut Socrates et hic homo demonstrato Socrate; quaedam sunt diversa numero et sunt idem in specie, ut Socrates et Plato, qui, licet conveniant in specie humana, tamen differunt numero. Quaedam autem differunt specie, sed sunt idem genere, sicut homo et asinus conveniunt in genere animalis; quaedam autem sunt diversa in genere, sed sunt idem solum secundum analogiam, sicut substantia et quantitas, quae non conveniunt in aliquo genere, sed conveniunt solum secundum analogiam: conveniunt enim in eo solum quod est ens. Ens autem non est genus, quia non praedicatur univoce, sed analogice.... Eorum igitur quae sunt idem numero, forma et materia sunt idem numero, ut Tullii et Ciceronis. Eorum autem quae sunt idem in specie diversa numero, etiam materia et forma non est eadem numero, sed specie, sicut Socratis et Platonis. Et similiter eorum quae sunt idem genere, et principia sunt idem genere: ut anima et corpus asini et equi differunt specie, sed sunt idem genere. Et similiter eorum quae conveniunt secundum analogiam tantum, principia sunt eadem secundum analogiam tantum, sive proportionem. Materia enim et forma et privatio, sive potentia et actus, sunt principia substantiae et aliorum generum. Tamen materia substantiae et quantitatis, et similiter forma et privatio differunt genere, sed conveniunt solum secundum proportionem in hoc quod, sicut se habet materia a substantiae ad substantiam in ratione materiae, ita se habet materia quantitatis ad quantitatem. Sicut tamen substantia est causa ceterorum, ita principia substantiae sunt principia omnium aliorum. *DPN*, ch. 6, vol. 43, pp. 46-47.

number, species, or genus (and if they differ in genus, then they are the same only according to analogy).

Applying this more particularly to substantial forms, it is not difficult to see that substantial forms can be the same in number, species, or genus and that they can differ either in number or in species. For example, Mr. Smith and this man (i.e., pointing to Mr. Smith) have the same substantial form, numerically speaking. Mr. Smith and Mrs. Smith have substantial forms which differ in number, but which are the same in species. Mr. Smith and this horse have substantial forms which differ in species, but which are the same in genus.

From this it is clear that when two substances (e.g., Mr. Smith and Mrs. Smith) have substantial forms that are the same in species, they can be said to have substantial forms which are of the "same kind," and that when two substances (e.g., Mr. Smith and this horse) have substantial forms which differ in species, they can be said to have substantial forms which are "different in kind." Yet, what is it, in the substantial forms themselves, in virtue of which they can be said to be "different in kind"? Or, in other words, how can one substantial form differ in kind from another? In answer to this, the Angelic Doctor says:

> The species and forms of things are found to differ from each other according to the more perfect and less perfect, just as in the order of things, the animate are more perfect than the inanimate, animals are more perfect than plants, and men are more perfect than brute animals; and in each of these genera there are diverse grades. And, thus, Aristotle, in the eighth book of the *Metaphysics*, likens the species of things to numbers, which differ in species according to the addition or subtraction of the unit. And in book two of the *On the Soul*, he compares the different souls to kinds of figures wherein one contains the other, as the pentagon contains the tetragon and exceeds it. Therefore, the intellectual soul contains in its power whatever is possessed by the sensitive soul of brutes and the nutritive soul of plants. Therefore, just as a surface which has a pentagonal shape is not tetragonal by one figure and pentagonal by another figure (for the tetragonal shape would be superfluous since it is contained within the pentagon), so too it is not through one

> soul that Socrates is a man and through another that he is an animal, but it is through one and the same soul [that he is both].[30]

The essence of St. Thomas's answer here is that it is because of the fact that some substantial forms stand to other substantial forms as the more perfect to the less perfect that they can be said to differ in kind. The way in which five differs from four and three or the way in which the pentagon differs from the quadrilateral and the triangle is like the way in which the substantial form of man differs from the substantial forms of the brute and the plant.

Further, just as five contains within itself the perfections of four and three, and more besides, and just as pentagon contains within itself the perfections of the quadrilateral and the triangle, and more besides, so, in a similar way, the substantial form of man contains within itself the perfections of the substantial forms of the brute and the plant, and more besides.[31] Moreover, St. Thomas goes on to say:

> ...it must be said that no other substantial form is in man besides the intellectual

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[30] Inveniuntur enim rerum species et formae differre ab invicem secundum perfectius et minus perfectum, sicut in rerum ordine animata perfectiora sunt inanimatis, et animalia plantis, et homines animalibus brutis, et in singulis horum generum sunt gradus diversi. Et ideo Aristoteles, in VIII Metaphys., assimilat species rerum numeris, qui differunt specie secundum additionem vel subtractionem unitatis. Et in II de anima, comparat diversas animas speciebus figurarum, quarum una continet aliam; sicut pentagonum continet tetragonum, et excedit. Sic igitur anima intellectiva continet in sua virtute quidquid habet anima sensitiva brutorum, et nutritiva plantarum. Sicut ergo superficies quae habet figuram pentagonam, non per aliam figuram est tetragona, et per aliam pentagona; quia superflueret figura tetragona, ex quo in pentagona continetur; ita nec per aliam animam Socrates est homo, et per aliam animal, sed per unam et eandem. *ST* I, q. 76, a. 3, vol. 5, p. 221.

[31] When speaking about this topic, St. Thomas interestingly points out how our concepts of genus and specific difference arise from these more perfect and less perfect substantial forms. In the same article just quoted, he says, "non oportet secundum diversas rationes vel intentiones logicas, quae consequuntur modum intelligendi, diversitatem in rebus naturalibus accipere, quia ratio unum et idem secundum diversos modos apprehendere potest. Quia igitur, ut dictum est, anima intellectiva virtute continet id quod sensitiva habet, et adhuc amplius; potest seorsum ratio considerare quod pertinet ad virtutem sensitivae, quasi quoddam imperfectum et materiale. Et quia hoc invenit commune homini et aliis animalibus, ex hoc rationem generis format. Id vero in quo anima intellectiva sensitiva excedit, accipit quasi formale et completivum, et ex eo format differentiam hominis." *ST* I, q. 76, a. 3 *ad 4um*, vol. 5, p. 221.

> soul. And just as this soul contains by its power the sensitive and nutritive souls, so too it contains by its power all lower forms and it itself causes whatever the more imperfect forms cause in other things. And something similar must be said regarding the sensitive soul in brutes, the nutritive soul in animals, and universally with respect to all more perfect forms in their relation to more imperfect forms.[32]

From this text we see quite distinctly what the order of substantial forms is, proceeding from the highest to the lowest. The substantial form of man is the highest substantial form and contains by its power not only the sensitive and nutritive souls (i.e., the substantial forms of brutes and plants respectively), but also every lower substantial form. Likewise, the substantial forms of brutes contain by their power not only the nutritive soul, but also every lower substantial form. And, again, the substantial forms of plants contain by their power every lower substantial form.[33]

Now, up to this point, we have been concerned only with what St. Thomas calls "perfect" or "complete" substantial forms. Yet, he makes it clear that there are some substantial forms which are, in a way, "imperfect" or "incomplete" (sometimes even called "intermediate forms").

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[32] Unde dicendum est quod nulla alia forma substantialis est in homine, nisi sola anima intellectiva; et quod ipsa, sicut virtute continet animam sensitivam et nutritivam, ita virtute continet omnes inferiores formas, et facit ipsa sola quidquid imperfectiores formae in aliis faciunt. Et similiter est dicendum de anima sensitiva in brutis, et de nutritiva in plantis, et universaliter de omnibus formis perfectioribus respectu imperfectiorum. *ST* I, q. 76, a. 4, vol. 5, p. 224.

[33] While it is clear that the substantial form of a man is more perfect than that of a brute animal and that the latter is more perfect than the substantial form of a plant, it is not as clear how the substantial form of one kind of brute animal can be said to be more perfect than that of another, and so too with the substantial forms of different kinds of plants.

Perhaps one way to begin to distinguish more perfect and less perfect substantial forms amongst different species of animals would be to note that some kinds of animals are said to be "more intelligent" than others. Dogs, for example, seem to be "smarter" than hunting wasps. Now if there are in fact levels of "animal intelligence," this would seem to be due to different levels of perfection found in the internal senses of animals of different species. But if different species of animals have different levels of perfection in their internal senses, these differences would seem to be owing to different levels of perfection in their respective substantial forms. For, as we saw in chapter six, it is finally from a natural substance's substantial form that its various proper and *per se* accidents flow forth (see *ST* I, q. 77, a. 6, vol. 5, pp. 245-246). And internal senses are certainly amongst a natural substance's proper and *per se* accidents. Regarding this matter more generally, see Fr. Lawrence Dewan, O.P., *Form and Being*, pp. 121-127

Addressing the distinction between the former and the latter, he states:

> Form [i.e., substantial form] is twofold: one is perfect which completes the species of some natural things, as the form of fire or of water or of a man or of a plant. But the other is incomplete form which neither perfects some natural species nor is the end of the intention of nature, but stands along the road of generation and corruption. For it is manifest in the generation of composites, for example [in the case] of animals, that between the beginning of generation, which is the semen, and the last form of the complete animal, there are many intermediate generations (as Avicenna says in his *Sufficiency*), which must be terminated at some forms, none of which makes a complete being according to some species, but rather incomplete beings which are along the road to some species. Similarly, on the part of corruption, there are many intermediate forms which are incomplete forms. For when the soul is separated, the body of the animal is not immediately resolved into the elements. Rather, this occurs [i.e., the resolution of the body of the animal into the elements] through many intermediate corruptions, through many imperfect forms succeeding in the matter the form of the animal, as for example, the form of the corpse, and afterwards the form of the rotting corpse, and so on. When, therefore, through corruption, the privation adjoining such a form [e.g., the privation of the substantial form of the animal which adjoins the substantial form of the corpse] is arrived at, there is corruption simply speaking. But when from the privation adjoining the imperfect form [e.g., the privation of the substantial form of the animal which adjoins the substantial form of some imperfect substance preceding the animal], which was along the road of generation, the complete form is arrived at, there is generation simply speaking.[34]

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[34] Sed duplex est forma: una quidem perfecta, quae complet speciem alicuius rei naturalis, sicut forma ignis vel aquae aut hominis aut plantae; alia autem est forma incompleta, quae neque perficit aliquam speciem naturalem, neque est finis intentionis naturae, sed se habet in via generationis vel corruptionis. Manifestum est enim in generatione compositorum, puta animalis, quod inter principium generationis, quod est semen, et ultimam formam animalis completi, sunt multae generationes mediae, ut Avicenna dicit in sua sufficientia; quas necesse est terminari ad aliquas formas, quarum nulla facit ens completum secundum speciem, sed ens incompletum, quod est via ad speciem aliquam. Similiter etiam ex parte corruptionis sunt multae formae mediae, quae sunt formae incompletae: non enim, separata anima, corpus animalis statim resolvitur in elementa; sed hoc fit per multas corruptiones medias, succedentibus sibi in materia multis formis imperfectis, sicut est forma corporis mortui, et postmodum putrefacti, et sic inde. Quando igitur per corruptionem pervenitur in privationem cui adiungitur talis forma in materia, est corruptio simpliciter: quando vero ex privatione cui adiungitur forma imperfecta, quae erat via generationis, pervenitur ad formam completam, est generatio simpliciter. *In de Gen.* Bk. 1, *lectio* 8, vol. 3, p. 292.

Another important text wherein St. Thomas explains this same doctrine is in *SCG*, Bk. 2, ch. 89, vol. 13, p. 542. There he writes: "Nec est inconveniens si aliquid intermediorum generatur et statim postmodum interrumpitur: quia intermedia non habent speciem completam, sed sunt ut in via ad speciem; et ideo non generantur ut permaneant, sed ut per ea ad ultimum generatum perveniatur. Nec est mirum si tota generationis transmutatio non est continua, sed sunt multae generationes intermediae: quia hoc etiam accidit in alteratione et augmento; non enim est tota alteratio continua, neque totum augmentum, sed solum motus localis est vere continuus, ut patet in VIII physicorum. Quanto igitur aliqua forma est nobilior et magis distans a forma elementi, tanto oportet esse plures formas intermedias, quibus gradatim ad formam ultimam veniatur, et per consequens plures generationes medias. Et

From this text, it seems that the essential difference between these two kinds of substantial forms is that, in virtue of a perfect or complete substantial form, a substance comes to be which is a *hoc aliquid* or "this something" according to the full meaning of the name, whereas, in virtue of an imperfect or incomplete substantial form, a substance comes to be which is a *hoc aliquid* or "this something"according to only part of the meaning of the name. Regarding these two meanings of *hoc aliquid*, St. Thomas says in the *Prima pars* that:

> ...*hoc aliquid* can be taken in two ways: in one way, for any subsistent thing; in another way, for a subsistent thing complete in the nature of some species. The first way excludes the inherence of an accident and a material form. The second way further excludes the imperfection of a part. Hence, a hand can be called a *hoc aliquid* in the first way, but not in the second way. Therefore, since the human soul is part of the human species, it can be called a *hoc aliquid* in the first way, as something subsistent, but not in the second way. For in this way the composite of soul and body is called a *hoc aliquid*.[35]

Hence, we can say that, in virtue of a perfect or complete substantial form, a substance (e.g., a man) comes to be which is a subsistent thing complete in the nature of some species. On the contrary, in virtue of an imperfect or incomplete substantial form, a substance (e.g., a corpse) comes to be which is a subsistent thing, but not one which is complete in the nature of some species. In other

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ideo in generatione animalis et hominis in quibus est forma perfectissima, sunt plurimae formae et generationes intermediae, et per consequens corruptiones, quia generatio unius est corruptio alterius. Anima igitur vegetabilis, quae primo inest, cum embryo vivit vita plantae, corrumpitur, et succedit anima perfectior, quae est nutritiva et sensitiva simul, et tunc embryo vivit vita animalis; hac autem corrupta, succedit anima rationalis ab extrinseco immissa, licet praecedentes fuerint virtute seminis."

[35] ...hoc aliquid potest accipi dupliciter, uno modo, pro quocumque subsistente, alio modo, pro subsistente completo in natura alicuius speciei. Primo modo, excludit inhaerentiam accidentis et formae materialis, secundo modo, excludit etiam imperfectionem partis. Unde manus posset dici hoc aliquid primo modo, sed non secundo modo. Sic igitur, cum anima humana sit pars speciei humanae, potest dici hoc aliquid primo modo, quasi subsistens, sed non secundo modo, sic enim compositum ex anima et corpore dicitur hoc aliquid. *ST* I, q. 75, a. 2 *ad 1um*, vol. 5, p. 196.

words, while every substance (e.g., a man) which is principled by a perfect or complete substantial form (e.g., a rational soul) is a *hoc aliquid* according to the full meaning of the name, every substance (e.g., a corpse) which is principled by an imperfect or incomplete substantial form (e.g., the substantial form of a corpse) is a *hoc aliquid* according to only part of the meaning of the name. In this way there is a certain likeness between a man's separated soul and his corpse. Both are subsistent things, but neither is complete in the nature of some species.[36]

Further, even though St. Thomas does not explicitly tell us how to distinguish those substances which have perfect or complete substantial forms from those that have only incomplete or imperfect substantial forms, it seems that one way to do so among living natural substances would be through observing which substances are capable of reproducing and which are not. The former would seem to be those which have perfect or complete substantial forms, while the latter would be those which have imperfect or incomplete substantial forms. For, as the Philosopher says, "the most natural of the works for living things which are complete and not mutilated or spontaneously generated is making another like themselves, an animal an animal, a plant a plant, so that they might always share, insofar as they are able, in always being and in the divine."[37]

Lastly, it is worth noting here that this distinction between these two kinds of substantial

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[36] A related question is whether all corpses of a certain sort (e.g., all corpses of men) are substances of the same kind or are one in species. Cajetan seems to think that there is reason to think that they might finally be of different species. Regarding this he states: "Si...credimus cadaver posse esse diversarum rationum – quod forte est verius – dicendum est quod, cum corruptio animalis non sit nisi propter exorbitantem motum alicuius elementi in ipso, quia quamdiu manet temperantia debita elementorum in animali nunquam corrumpitur, diversificabitur cadaveris forma iuxta agentis elementi diversitatem; ita quod quando in animali colera vincit, ignis cuius virtus est humor colericus agit ut animal resolvat in ignem et, quia non potest ad hoc statim perducere, paulatim ad hoc disponit per multas generationes et corruptiones quarum prima est ad cadaver." From his, *Commentaria in De Anima Aristotelis*, ch. 1, pp. 46-47.

[37] *On the Soul*, Bk. 2, ch. 4, 415a28-415b2. Regarding imperfect or incomplete substantial forms and their applicability to the beginning and end of human life, see. Fr. Philip Smith, O.P., "Transient Natures at the Edges of Life," *The Thomist* 54 (1990), pp. 191-227.

forms helps us to see more fully what is involved in the distinction made above between a *generatio simplex* and a *generatio continens in se plures generationes et corruptiones*. The former, we can now say, is simply a substantial becoming wherein first matter loses one perfect or complete substantial form and acquires another perfect or complete substantial form. The latter, by contrast, is actually many substantial becomings in which first matter loses and acquires many imperfect or incomplete substantial forms until the last substantial becoming wherein first matter loses an imperfect or incomplete substantial form and acquires a perfect or complete substantial form.

From the foregoing, then, we can conclude that only a specific understanding of the natures of first matter, substantial form, and the privation of substantial form is able to give an adequate account of the difference in kind between the substances involved in substantial becoming. For, as we have seen, it is due precisely to these inward principles and causes (and principally to substantial form) that the natural substances which are involved in substantial becoming both are and are of a certain kind.

### 4. The *Principia Naturae* and the Reality of Substantial Becoming

Lastly, we have to show that these same three principles are the only ones which can adequately account for the reality of substantial becoming itself. Now from what has gone before, it is already evident that first matter, substantial form, and the privation of substantial form account for or explain the reality of substantial becoming. But now we must show that these principles are the only ones which are capable of accounting for the reality of substantial becoming.

In order to make it manifest that this is in fact so, let us begin with a text from St. Thomas. In the *De potentia*, he writes:

> ...in every change it is necessary that there be something the same which is common to each term of the change. For if the opposite terms of the change did not agree in anything, [the change] could not be said to be a transition from one thing into another. For in the name "change" or "transition" the same thing is signified as having itself differently now and before. Furthermore, the very terms of the change are not incompatible, which is required in order for them to be terms of the change, except insofar as they are referred to the same thing. For if two contraries are referred to diverse subjects, they can both be at the same time. Sometimes, therefore, it happens that the one subject common to each term of the change is something existing in act; and, then, we have motion properly speaking, as in alteration, growth, diminution, and change of place. For in all of these motions one and the same subject, existing in act, changes from one opposite into the other. But sometimes the same subject common to each term is not in fact a being in act, but a being in potency only, as happens in generation and corruption simply speaking. For the subject of substantial form and privation is first matter, which is not a being in act. Hence, neither generation nor corruption is properly called "motion," rather, they are certain "changes." But sometimes there is a common subject which exists neither in act nor in potency; rather, there is one continuous time in the first part of which there is one opposite and in the second another. Hence, we say that this comes to be from that, that is, after that, as when we say that noontime comes to be from morning. But this is not properly called change, except by a likeness, insofar as we imagine a certain time itself to be as a subject of those things which are done in that time.[38]

The import of this text is that it enables us to see quite distinctly that in every becoming there must be a material principle and that there are only two things which can serve, properly speaking, as a

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[38] ... in mutatione qualibet requiritur quod sit aliquid idem commune utrique mutationis termino. Si enim termini mutationis oppositi in nullo eodem convenirent, non posset vocari transitus ex uno in alterum. In nomine enim mutationis et transitus designatur aliquid idem, aliter se habere nunc et prius; et etiam ipsi mutationis termini non sunt incontingentes, quod requiritur ad hoc ut sint mutationis termini, nisi in quantum referuntur ad idem. Nam duo contraria si ad diversa subiecta referantur, contingit simul esse. Quandoque ergo contingit quod utrique mutationis termino est unum commune subiectum actu existens; et tunc proprie est motus; sicut accidit in alteratione et augmento et diminutione et loci mutatione. Nam in omnibus his motibus subiectum unum et idem actu existens, de opposito in oppositum mutatur. Quandoque vero est idem commune subiectum utrique termino, non quidem ens actu, sed ens in potentia tantum, sicut accidit in generatione et corruptione simpliciter. Formae enim substantialis et privationis subiectum est materia prima, quae non est ens actu: unde nec generatio nec corruptio proprie dicuntur motus, sed mutationes quaedam. Quandoque vero non est aliquod subiectum commune neque actu neque potentia existens; sed est idem tempus continuum, in cuius prima parte est unum oppositum et in secunda aliud, ut cum dicimus hoc fieri ex hoc, id est post hoc, sicut ex mane fit meridies. Sed haec non proprie vocatur mutatio, sed per similitudinem, prout ipsum tempus imaginamur quasi subiectum eorum quae in tempore aguntur. *De potentia*, q. 3, a. 2, vol. 2, pp. 41-42 .

material principle in a becoming. These are a substance and the ability to be a substance, that is, first matter. Thus, in every substantial becoming there must be a material principle and this material principle must either be a substance or the ability to be a substance, that is, first matter.

But it can be shown without difficulty that the material principle in substantial becoming cannot be a substance. Fr. Gredt argues for this conclusion in the following way:

> Matter which is not pure potency already has substantial existence. Therefore, it cannot receive this existence [i.e., substantial existence] from form. [For] through substantial existence, matter, with which it [i.e., the substantial existence] is identified, is already a substance subsisting through itself. Whence, form cannot determine it [i.e., the matter] substantially, but only accidentally in the way in which an accidental form gives secondary existence.[39]

We see from this argument that if the material principle in substantial becoming were a substance, then the substantial becoming in question would not truly be a substantial becoming. For no substance would come to be through this becoming. Rather, the only thing that would occur here would be that the substance which, as we are saying, underlies the becoming would become such. Hence, we see from this that we cannot account for the reality of substantial becoming unless we maintain that the material principle in this becoming is nothing other than the ability to be a substance, that is, first matter.[40]

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[39] Materia, quae non est pura potentia, iam habet esse substantiale. Ergo non potest hoc esse recipere a forma. Per esse substantiale, quocum identificatur, materia iam est substantia per se subsistens. Quare forma eam non substantialiter, sed accidentaliter tantum determinare potest tamquam forma accidentalis dans esse secundarium. *op. cit.*, #259, p. 219.

[40] On this point Ralph McInerny says: "Aquello a lo cual el cambio substantial es atribuito, su subjeto, no puede ser él mismo una substancia. Porque, en tal caso, lo que se obtiene en el cambio es un accidente y no es constitutivo de la substancia como tal. Pero nosotros estamos tratando de explicar el cambio substancial. Así, el subjeto o materia del cambio substancial debe ser distinto del subjeto o materia del cambio accidental. Hay que señalar que, a diferencia del anterior, Aristóteles denomina a ésta materia prima. La forma que la materia prima adquiere como resultado del cambio es una forma substantial." From his, "La Materia Prima es Conocida por Analogía," *Revista de Filosofía* 2 (1987), p. 102.

In a similar manner, we can show that, without substantial form and the privation thereof, it is impossible to account for the reality of substantial becoming. We have observed above that accidental form and substantial form are the only two kinds of form which enter into composition with matter. For since every form which enters into composition with matter gives existence to that matter, and since there are only two kinds of existence that can be given to matter, namely, accidental existence and substantial existence,[41] it follows that there are only two kinds of form which enter into composition with matter, that is, accidental form and substantial form.

But granted this, it is easy to see that substantial form is necessary in order to account for the reality of substantial becoming. For in every becoming the material principle acquires a form which it previously lacked. Hence, in every substantial becoming first matter acquires a form which it previously lacked. But if in substantial becoming first matter were to acquire an accidental form which it previously lacked, at least two absurdities would follow. First, at the end of this supposed substantial becoming, an accidental form would be united immediately to first matter. But this was shown to be impossible above. Second, it would follow that the terminus of this supposed substantial becoming would not be a substance, but something else (i.e., a union of accidental form with first matter). But a substantial becoming is called such precisely because its term-to-which is a substance. It is manifest, therefore, that in substantial becoming first matter cannot acquire some accidental form which it previously lacked. Hence, it must be the case that in every substantial becoming, first matter acquires some substantial form which it previously lacked. Thus, we see here that substantial form is necessary in order to account for the reality of substantial becoming.

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[41] It is helpful to recall here that we see that there are only two kinds of existence that can be given to a material principle through seeing that the opposition between substance and accident is that of contradiction (i.e., *non esse in subiecto vs. esse in subiecto*).

Now from this it follows that the privation of substantial form is also necessary in order to account for the reality of substantial becoming. For, again, since in every becoming some material principle acquires some form which it previously lacked, it must be that the privation of the form acquired and the form acquired are both of the same order. That is, it is necessary that, on the one hand, the privation of some accidental form and the accidental form itself are both of the accidental order and that the privation of some substantial form and the substantial form itself are both of the substantial order. For, if we were to suppose otherwise, then we would have either a becoming wherein the material principle acquires a substantial form while it was lacking an accidental form or a becoming wherein the material principle acquires an accidental form while it was lacking a substantial form. Now in either case, we would not have a genuine change from non-being to being, which is what becoming is, since the terms of the becoming or change would not be incompatible as such. For example, if a man were to acquire the accidental form of the art of music while the first matter in him were lacking the substantial form or a horse, we would not have a genuine change from non-being to being, since there is no incompatibility between lacking the substantial form of a horse and having the accidental form the art of music. Hence, we see that in every becoming the privation of the form acquired and the form acquired must both be of the same order. But we also stated above that in every becoming the material principle acquires a form which it previously lacked. Applying this, then, to substantial becoming, we must hold that, in every substantial becoming, it is necessary that the material principle acquire a substantial form which it previously lacked. And, from this, we see that the privation of substantial form is necessary in order to account for the reality of substantial becoming.

In conclusion to this section of this part of this chapter, it should be clear that only a specific

understanding of the natures of first matter, substantial form, and the privation of substantial form is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind amongst the substances involved in substantial becoming, and c) the reality of substantial becoming itself. Nevertheless, we still have to provide here a definitive resolution to the difficulty raised by *Monism* and *Pluralism*, and explain why the proponents of *Monism* and *Pluralism* have erred in their understanding of the *principia naturae*.

5. The Definitive Resolution to the Dilemma Raised by *Monism* and *Pluralism*

Before setting forth the resolution to the difficulty raised by *Monism* and *Pluralism*, let us revisit the difficulty itself which was first raised in chapter two. There the proponents of *Monism* and *Pluralism* maintained that it is erroneous for us to think that this substance of this kind becomes that substance of that kind. They also instructed us that either we can hold fast to what we think we know from our common experience, and thereby eschew any possibility of having a truly scientific account of what we call "substantial becoming," or we can jettison what we think we know from our common experience, and thereby dispose ourselves to acquire a truly scientific account of what we commonly call "substantial becoming." But these tenets of the proponents of *Monism* and *Pluralism*, we will recall, were founded upon a certain dilemma which they hold to be insoluble. This dilemma was as follows: Whenever this substance of this kind becomes that substance of that kind, some material principle changes from being this substance of this kind to being that substance of that kind. Now this material principle is either a non-substance or a substance. But this material principle cannot be a non-substance. For if it were, then a non-substance would become a substance and, therefore, it would be true to say that "a non-substance

is a substance," which is absurd. Further, if the material principle were a non-substance, then the material principle would really be nothing (for it would be neither a substance nor some accident[s]), and, hence, we would be forced to posit a becoming in which there is no material principle. But a becoming in which there is nothing which becomes is impossible. Hence, it is clear that the material principle in question cannot be a non-substance.

But since non-substance and substance are opposed as contradictories, if the material principle in question is not a non-substance, then it must be a substance. But if the material principle in question is a substance, then the becoming which this material principle underlies must be an accidental becoming. For whenever a substance underlies a becoming, the substance in question only changes from being in this respect to being in that respect. Hence, we must hold that the becomings which, through our common experience, we understand to be substantial becomings, are in truth only accidental becomings. That is, whenever we think we see this substance of this kind become that substance of that kind, what is really occurring is that some substance is merely changing from being in this respect to being in that respect.[42]

Now in order to resolve this dilemma, we shall set forth and explicate Aristotle's resolution of this dilemma as it is laid out in chapter eight of the first book of the *Physics*. And, in the process of doing this, we shall show how St. Thomas's commentary completes Aristotle's resolution in such a way as to refute definitively the dilemma through a specific understanding of the natures of the *principia naturae*. Let us begin, then, with Aristotle's text. He writes:

> We say, however, that the [phrases] "to come to be from being or from non-being," or "non-being or being does or suffers something or comes to be any 'this'," do not

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[42] Further, we observed in chapter two that what this position finally comes to is that the only kind of change under the sun is change of place.

> differ, in one way, from the [phrases], "the doctor does or suffers something" or "from the doctor something else is or comes to be." Whence, since this latter is said in two ways, it is clear that "from being" and "being does or suffers" are also [said in two ways]. The doctor builds a house, then, not as doctor but as house-builder, and he comes to be fair not as doctor but as dark; but he cures or comes to be a non-doctor as a doctor. Since most properly we say that the doctor does or suffers or comes to be something from doctor when he suffers or does or comes to be these things as doctor, it is clear that "to come to be from non-being" also signifies this, "as non-being." Not noting this, those thinkers went astray; and because of this ignorance they became so ignorant as to believe that nothing of the others [besides being itself] comes to be or is, but they do away with all coming to be. We ourselves, however, say that nothing comes to be from non-being simply; nonetheless, somehow there is coming to be from non-being, as accidentally. For something comes to be from its privation, which is in virtue of itself non-being, not being present [in what comes to be]. But this is wondered at, and it seems impossible that something comes to be in this way, from non-being. So too, neither does being come to be from being, except accidentally. But being does come to be thus, in the same way as if an animal should come to be from an animal, and some animal from some animal, as if dog came to be from horse. For the dog would come to be not only from some animal, but also from animal, but not as animal. For this is already present. But if something is to come to be an animal not accidentally, it will not be from animal. And if something [is to come to be] a being, it will not be from being, nor from non-being. For it was said by us what "from non-being" signifies, that it means "as non-being." Moreover, we do not do away with [the claim] that everything either is or is not. This, then, is one way [to solve the difficulty]. (Another is [to note] that the same things can be spoken of according to potency and according to act. But this has been determined with greater precision in other works.) Whence, as indeed was said, the difficulties due to which some thinkers in question were constrained to do away with some of the things being discussed are solved. For it was due to this difficulty that earlier thinkers were so far led away from the path of coming to be and destruction and, generally, of change. For, this nature having been seen, all their ignorance would have been solved.[43]

It is clear enough that in this text Aristotle does four things. First, he makes a distinction. Second, he shows how this distinction can be used in order to resolve the dilemma set forth above. Third, he alludes to a second way of resolving this dilemma. Fourth, he concludes by telling us what sort of understanding would have enabled those who set forth this dilemma to have seen its proper

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[43] *Physics*, Bk. 1, ch. 8, 191a35-191b34.

resolution.[44]

The distinction that Aristotle makes is between what is attributed to a subject *per se* and what is attributed to a subject *per accidens*. We can truthfully say both, "the doctor heals," and "the doctor builds." Nevertheless, there is an essential distinction between these two statements. For in the former statement, "heals," is attributed to the doctor *per se* (for the doctor does heal qua doctor), while in the latter statement, "builds," is attributed to the doctor *per accidens* (for the doctor does not build qua doctor, but qua builder).

Now, looking back to the dilemma presented above, we can see that it hinges on the claim that the material principle in substantial becoming is either a non-substance or a substance. Or, to put this slightly differently, the dilemma maintains (1) that any defender of common experience must hold either that, "a non-substance becomes a substance," or that, "a substance becomes a substance," and (2) that both of these statements are false. But in light of Aristotle's distinction, we can see that "becomes a substance" can be attributed to both "a non-substance" and "a substance" either *per se* or *per accidens*. In other words, "becomes a substance," can be attributed to "a non-substance" either precisely insofar as a non-substance is a non-substance or insofar as being a non-substance happens to something to which "becomes a substance" is attributed *per se*. Likewise, "becomes a substance," can be attributed to "a substance" either precisely insofar as a substance is a substance or insofar as being a substance happens to something to which "becomes a substance" is attributed *per se*.

Next, Aristotle shows us that while it is false to attribute, "becomes a substance," either to "a non-substance" or to "a substance" *per se*, it is true to attribute, "becomes a substance," both to

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[44] See St. Thomas's *In Phys.*, Bk. I, *lectio* 14, vol. 2, p. 49.

"a non-substance" and to "a substance" *per accidens*. Regarding the former, Aristotle seems to admit that the dilemma really does hold if one attributes, "becomes a substance," either to "a non-substance" or to "a substance" *per se*. That is, if we maintain that, "a non-substance insofar as it is a non-substance becomes a substance," then we really would have to say, as the dilemma points out, that there is a becoming in which nothing becomes, which is absurd. Likewise, if we maintain that, "a substance insofar as it is a substance becomes a substance," then we really would have to hold, as the dilemma sets forth, that substantial becoming is in truth nothing other than accidental becoming.

This notwithstanding, Aristotle points out that we can avoid the horns of this dilemma, if we are careful to affirm only what is given to us in our common experience, namely, that "becomes a substance" is to be attributed to both "a non-substance" and to "a substance" merely *per accidens*. He says that we can see that a non-substance does not as such become a substance, since the former "is in virtue of itself non-being, not being present [in what comes to be]." That is, non-substance cannot truly be the material principle in substantial becoming both because it is "in virtue of itself non-being," and because it does not enter into the constitution of the substance which is the term-to-which of substantial becoming. For example, if we say, "the non-man becomes a man," it is clear that "becomes a man" cannot be attributed to "the non-man" *per se*, since the latter is in virtue of itself non-being (and, hence, cannot serve as the material principle in substantial becoming) and since it does not enter into the constitution of "a man," which is the term-to-which of the substantial becoming in question. Nevertheless, it is true to attribute "becomes a man" to "the non-man" in some way, since only what is not a man can become a man. Hence, while we cannot affirm that "becomes a substance," is attributable to "a non-substance" precisely insofar as it is a non-

substance, we must affirm that "becomes a substance" is attributable to "a non-substance" insofar as being a non-substance happens to something to which "becomes a substance" is attributed *per se*.

Likewise, Aristotle shows that, if we attend to our common experience, we must maintain that "becomes a substance" is attributable to "substance" only *per accidens*. He begins to do this through pointing out that in every substantial becoming, it is not substance that comes to be *per se*, but rather this substance or that substance. For, if substance were what comes to be *per se*, then there could be no substance in existence before the change, since nothing is before it comes to be. Further, Aristotle manifests this using the example of a horse becoming a dog. If a horse becomes a dog, then we can say, "some animal becomes some animal" and "animal becomes animal." Yet, when we express this substantial becoming in this second way, we must attend to the fact that animal is not coming to be *per se*, but only *per accidens*, for the nature of animal existed before this substantial becoming (i.e., in the horse which pre-exists the dog). Utilizing a different example to make the same point, St. Thomas maintains:

> Since everything which comes to be, comes to be in order that it might be, it is necessary, if something which was beforehand is said to come to be, that it not come to be *per se*, but rather, *per accidens*. On the other hand, that [is said to come to be] *per se* which was not beforehand. For example, if black comes to be from white, both black and color come to be. Now black comes to be *per se*, for it comes to be from non-black. Color, however, comes to be *per accidens*, since it was beforehand. Thus, when some being comes to be, as man or stone, man comes to be *per se*, since [he comes to be] from non-man. Being, however, comes to be *per accidens*, since [it does not come to be] from non-being simply, but from not this being, as the Philosopher says, in Book One of the *Physics*.[45]

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[45] Cum omne quod fit ad hoc fiat ut sit, oportet, si aliquid fieri dicatur quod prius fuerit, quod hoc non fiat per se, sed per accidens, per se vero illud quod prius non fuit: ut, si ex albo fiat nigrum, fit quidem et nigrum et coloratum, sed nigrum per se, quia fit ex non nigro, coloratum autem per accidens, nam prius coloratum erat. Sic igitur, cum fit aliquod ens, ut homo vel lapis, homo quidem fit per se, quia ex non homine: ens autem per accidens,

Thus, since whenever this substance of this kind becomes that substance of that kind, substance comes to be only *per accidens*, while "that substance of that kind" comes to be *per se*, there is nothing to prevent "this substance of this kind" from existing beforehand. In fact, this is precisely what we all commonly experience. That is, we experience this horse becoming that dog, this man becoming that corpse, and so forth. Further, we see that the substance which comes to be *per se*, as the term-to-which of a substantial becoming, is different from the substance to which the substantial becoming is attributed. More specifically, we all acknowledge that this dog is different from that horse, that this corpse is different from that man, and so on. Hence, rather than maintain that "becomes a substance" is attributable to "a substance,"precisely insofar as it is a substance, and, thus, destroy the very substantial becoming which we are attempting to explain, we must hold, in accordance with what we know from our common experience, that "becomes a substance" is attributable to "a substance" insofar as being a substance happens to something to which "becomes a substance" is attributed *per se*.

From the foregoing, then, we have an initial resolution to the supposedly insoluble dilemma set forth by the proponents of *Monism* and *Pluralism*. For we have observed that "becomes a substance" can be attributed both to "a non-substance" and to "a substance" either *per se* or *per accidens*. Further, we have seen that it is only when "becomes a substance" is attributed *per se* to "a non-substance" and to "a substance" that the consequences of the aforementioned dilemma

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quia non ex non ente simpliciter, sed ex non ente hoc, ut philosophus dicit, in I physicorum. *SCG*, Bk, 2, ch. 21, vol. 13, p. 314.

It is worthwhile contrasting this text with the following one: "Dicitur...non ens tripliciter. Uno modo quod nullo modo est; et ex tali non ente non fit generatio, quia ex nihilo nihil fit secundum naturam. Alio modo dicitur non ens ipsa privatio, quae consideratur in aliquo subiecto: et ex tali non ente fit quidem generatio, sed per accidens, inquantum scilicet generatio fit ex subiecto, cui accidit privatio. Tertio modo dicitur non ens ipsa materia, quae, quantum est de se, non est ens actu, sed ens potentia. Et ex tali non ente fit generatio per se." *In Metaphys.*, Bk. 12, *lectio* 2, p. 688 (#2437).

actually follow. Lastly, we have seen here that what we know from our common experience of substantial becoming only demands that we attribute "becomes a substance" *per accidens* to "a non-substance" and to "a substance." Hence, both in keeping with what we know from our common experience and contrary to the dilemma set forth by the proponents of *Monism* and *Pluralism*, we must maintain that it is neither to "a non-substance" nor to "a substance" that "becomes a substance" is attributed *per se*, but rather, it is to that to which both being a non-substance and being a substance happen that "becomes a substance" is attributed *per se*.

Nevertheless, with St. Thomas, we maintain that this is only an initial resolution of the dilemma set forth by the proponents of *Monism* and *Pluralism*, since it is quite plainly insufficient or incomplete. For this resolution merely makes clear that neither non-substance nor substance is the *per se* material principle of substantial becoming. Thus, this resolution fails to manifest what this *per se* material principle truly consists in. Summarizing this initial resolution and adding to it, St. Thomas writes:

> ...and just as when this animal comes to be from that animal, or this body from that body, every body or every non-body, every animal or every non-animal is not removed from that something which comes to be, so too neither every existence nor every non-existence is removed from that from which this being comes to be. For that which this being, which is fire, comes to be, has some existence, since it is air, and some non-existence, since it is not fire.
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> This, therefore, is one way of solving the aforementioned difficulty. But this solution is insufficient. For if being comes to be *per accidens* from both being and non-being, it is necessary to posit something from which it comes to be *per se*. For everything which is *per accidens* is reduced to what is *per se*.
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> In order, therefore, to show that from which something comes to be *per se*, he [i.e., Aristotle] adds a second way [of solving this difficulty]...
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> He [i.e., Aristotle] says that it happens that the same thing is said both according to potency and according to act, as is determined more definitely in other words, namely, in Book Nine of the *Metaphysics*. Thus, something comes to be from being in potency *per se*. But something comes to be from being in act and from non-being *per accidens*.

> Now he says this because matter, which is being in potency, is that from which something comes to be *per se*. For it is what enters into the substance of the thing made. But something comes to be *per accidens* from privation and from the preceding form insofar as it belongs to the matter, from which something comes to be *per se*, to be under such a form or to be under such a privation; just as the statue comes to be from bronze *per se*, but from not having such a shape and from having some other shape, the statue comes to be *per accidens*.[46]

There are two essential points which we must glean from this text. First, we must see that, in fact, this dilemma rests on an insufficient understanding of substance. Second, it is essential to see that the sufficient or complete resolution of this dilemma can be made only in terms of a specific understanding of the principles of nature arrived at above.

Regarding this first point, we must recall that the proponents of *Monism* and *Pluralism* hold that "becomes a substance" must be attributed *per se* either to "a non-substance" or to "a substance." Now, although these names are exhaustive according to their normal meanings, they are not exhaustive according to the meanings which they have in the dilemma presented above. For in the dilemma it is clear that "a substance" really means an actually existing substance. Hence,

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[46] ...et sicut cum hoc animal fit ex hoc animali, vel hoc corpus ex hoc corpore, non removetur omne corpus nec omne non corpus, nec omne animal vel non animal, ab eo ex quo aliquid fit; sic non removetur ab eo ex quo fit hoc ens, neque omne esse neque omne non esse: quia id ex quo fit hoc ens quod est ignis, habet aliquod esse, quia est aer, et aliquod non esse, quia non est ignis.

Iste est igitur unus modus solvendi praedictam dubitationem. Sed iste modus solvendi insufficiens est: si enim ens fit per accidens et ex ente et ex non ente, oportet ponere aliquid ex quo fiat ens per se; quia omne quod est per accidens, reducitur ad id quod est per se.

Ad ostendendum igitur ex quo fit aliquid per se, subiungit secundum modum, ibi: alius autem quoniam et cetera. Et dicit quod contingit aliqua eadem dicere et secundum potentiam et secundum actum, ut certius determinatum est in aliis, scilicet in IX Metaphys. Ex ente igitur in potentia fit aliquid per se; ex ente autem in actu, vel ex non ente, fit aliquid per accidens. Hoc autem dicit quia materia, quae est ens in potentia, est id ex quo fit aliquid per se: haec est enim quae intrat substantiam rei factae. Sed ex privatione vel forma praecedente fit aliquid per accidens, inquantum materiae ex qua fit aliquid per se, conveniebat esse sub tali forma vel sub tali privatione; sicut statua ex aere fit per se, sed ex non habente talem figuram et ex habente aliam figuram, fit statua per accidens. *In Phys.*, Bk. 1, *lectio* 14, vol. 2, p. 50.

according to the proponents of *Monism* and *Pluralism*, "becomes a substance" must be attributed *per se* either to "a non-substance" or to "an actually existing substance." These alternatives, however, are not exhaustive. For between what is not a substance in any way at all and what is an actually existing substance, there is what is able to be an actually existing substance. That is, between these two alternatives lies substance in ability or the very ability to receive substantial form, which is nothing other than what we have shown to be the nature of first matter or the material principle which underlies substantial becoming. Thus, we see that the dilemma set forth by the proponents of *Monism* and *Pluralism* rests on an equivocation which stems from an insufficient understanding of substance.

As for the second point, it is only when we see that the principle to which "becomes a substance" is attributed *per se* is neither "a non-substance," nor "an actually existing substance," that we are able to see most completely the resolution to this seemingly insoluble dilemma. In other words, we see this resolution most perfectly once we see that the *per se* material principle in substantial becoming is nothing other than first matter, the nature of which is pure passive ability. For, as was shown in chapter six, it is precisely pure passive ability or the very ability to receive substantial form that in virtue of itself becomes a substance whenever this substance of this kind becomes that substance of that kind. And that it is to this *per se* material principle that the privation of a substantial form (which is, in a way, "a non-substance") and some preceding substantial form (which is, in a way, "an actually existing substance") happen. This seems to be why Aristotle ends his text cited above with the somewhat cryptic statement: "For, this nature having been seen, all their ignorance would have been solved." That is, if the proponents of *Monism* and *Pluralism* had seen the nature of first matter, together with what this implies regarding the natures of substantial

form and the privation thereof, they would have seen the complete resolution of their dilemma.

### 6. Why the Proponents of *Monism* and *Pluralism* Went Astray

At this point it is clear that the principal error of the proponents of *Monism* and *Pluralism* consists essentially in mixing up what is *per se* with what is *per accidens*. We must now explain why these men have fallen into this error which is traditionally known as the *fallacia accidentis*. Perhaps the first thing to note regarding their error is that it is easy to fall into. For, regarding a mistake made by Plato vis à vis our knowledge of the natural world, St. Thomas says:

> It must be said that on account of the difficulty of this question [i.e., whether natural science is concerned with those things that are in matter and motion] Plato was forced to posit the ideas. For, since as the Philosopher says in Book One of the *Metaphysics*, he [i.e., Plato] believed all sensible things always to be in flux, according to the opinion of Cratylus and Heraclitus, he judged that it was impossible to have scientific knowledge about them and posited certain substances separated from sensible things about which we have scientific knowledge and definitions. But this failure happened because he did not distinguish what is *per se* from what is *secundum accidens*. For *secundum accidens* even the wise are very often deceived, as is said in Book One of *On Sophistical Refutations*.
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> But, as is proved in Book Seven of the *Metaphysics*, there is in a sensible substance both the integral whole itself, that is, the composite, and the account, that is, its form. Now the composite is generated and corrupted *per se*, but the account or form [is generated and corrupted] only *per accidens*. For house does not come to be, as is said in the same place, but this house. But each thing can be considered without all of those things which do not belong to it *per se*. Thus, although the form and accounts of things exist in things subject to motion, nevertheless, considered in themselves, they are apart from motion. And, hence, there are sciences and definitions concerning these things, as the Philosopher says. The sciences of sensible things, however, are not founded on knowledge of some substances separated from sensible things, as is proved in the same place.[47]

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[47] Dicendum quod propter difficultatem huius quaestionis coactus est Plato ad ponendum ideas. Cum enim, ut dicit philosophus in I metaphysicae, crederet omnia sensibilia semper esse in fluxu, secundum opinionem Cratyli et Heracliti, et ita existimaret de eis non posse esse scientiam, posuit quasdam substantias a sensibilibus separatas, de quibus essent scientiae et darentur diffinitiones. Sed hic defectus accidit ex eo quod non distinxit quod est per se ab eo quod est secundum accidens, nam secundum accidens falluntur plerumque etiam sapientes, ut dicitur in I elenchorum. Ut autem probatur in VII metaphysicae, cum in substantia sensibili inveniatur et ipsum integrum,

As St. Thomas explains it, Plato thought that because particular sensible substances come to be and pass away, the nature of sensible substance itself must likewise be generable and corruptible and, hence, unknowable scientifically. Here, however, Plato failed to distinguish what is generated and corrupted *per se* from what is generated and corrupted only *per accidens*. For, as we have seen already, when a horse becomes a dog, this particular dog comes to be *per se*, while animal comes to be only *per accidens*. Likewise, when a house comes to be, this particular house comes to be *per se*, while house comes to be only *per accidens*. Hence, what Plato should have said was that the particular sensible substances are the things which are generable and corruptible *per se*, while their natures are generable and corruptible only *per accidens*. Hence, as St. Thomas notes, this objection does not preclude us from truly having scientific knowledge of the natural world.

Further, in noting that the wise are often deceived by what is *per accidens*, St. Thomas is not saying that even the wise do not know the distinction between what is *per se* and what is *per accidens*, but rather, that even the wise often fail to distinguish properly between the two. And, indeed, this seems to be precisely what is wrong with the positions known as *Monism* and *Pluralism*. For when the proponents of these positions inquired into the principles of substantial becoming, for some reason they failed to distinguish first matter from something which happens to it insofar as it is the *per se* material principle in substantial becoming. That is, these proponents failed to distinguish first matter itself from the substantial form which belongs to the substance to

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id est compositum, et ratio, id est forma eius, per se quidem generatur et corrumpitur compositum, non autem ratio sive forma, sed solum per accidens. Non enim fit domum esse, ut ibidem dicitur, sed hanc domum. Unumquodque autem potest considerari sine omnibus his quae ei non per se comparantur. Et ideo formae et rationes rerum quamvis in motu exsistentium, prout in se considerantur, absque motu sunt. Et sic de eis sunt scientiae et diffinitiones, ut ibidem philosophus dicit. Non autem scientiae sensibilium substantiarum fundantur super cognitione aliquarum substantiarum a sensibilibus separatarum, ut ibidem probatur. *In de Trin.*, q. 5, a. 2, vol. 50, p. 143.

which the substantial becoming is attributed and, hence, they failed to see any distinction between first matter and the substance of which it is a part (i.e., the substance to which the substantial becoming is attributed).

This, then, leads to our final consideration in this chapter. Why did the proponents of *Monism* and *Pluralism* go astray in their understanding of the *principia naturae*? Or, more specifically, why did the proponents of *Monism* and *Pluralism* fail to distinguish first matter from the substantial form which belongs to the substance to which the substantial becoming is attributed?

There seem to be at least three reasons for this error, two on the part of first matter itself, and one on the part of the proponents of *Monism* and *Pluralism* insofar as they are men. Beginning with those reasons that are on the part of first matter, we can say that the first of these reasons pertains to the fact that first matter and substantial form are causes of each other. As St. Thomas succinctly puts it, "matter is called a cause of form insofar as form does not exist except in matter; and, similarly, form is a cause of matter insofar as matter does not have existence in act except through form."[48] Now, as we noted in the last chapter, because matter and form depend on each other in order to be, the one can never be found without the other.[49] But this implies that first matter always has some substantial form through which it shares in substantial existence. Further, what is always or almost always is *per se*. In other words, we judge that this thing and that thing are joined *per se* once we see that the former is always or almost always accompanied by the latter. Therefore, since some substantial form always belongs to first matter, and since what is always or

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[48] Materia...dicitur causa forme inquantum forma non est nisi in materia; et similiter forma est causa materie in quantum materia non habet esse in actu nisi per formam... *DPN*, ch. 4, vol. 43, p. 44.

[49] As was also made clear in the last chapter, the substantial form of man (i.e., the rational soul) is an exception here.

almost always is *per se*, it seems natural to conclude that some substantial form belongs to first matter *per se*. But this is to say that first matter has the nature of some substance through itself. Hence, it seems natural to conclude that first matter is some substance.[50] It is clear from this, then, that one reason why the proponents of *Monism* and *Pluralism* fail to distinguish first matter from the substantial form which belongs to the substance to which the substantial becoming is attributed is because first matter depends on substantial form in order to be.

Now the second reason is closely connected with the first reason. For just as the first reason focuses on the fact that first matter depends on substantial form in order to be, so the second reason focuses on the fact that first matter depends on substantial form in order to be known. Addressing this point, St. Thomas writes in the *DPN*:

> And since every definition and all knowledge is through form it follows that first matter cannot be known or defined through itself. Rather, [it must be known] through a comparison as when it is said that first matter is what stands to all forms and privations as bronze stands to the shape of a statue and to the lack of that shape.[51]

Here St. Thomas makes the point that it is owing to the fact that first matter does not have anything formal to its nature that it cannot be known to us through itself.[52] In other words, in itself first

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[50] Although this line of argument appears reasonable, in light of the considerations made in the last chapter, we can see that, in fact, it contains a fatal flaw. More specifically, this line of reasoning fails to distinguish between what first matter depends on in order to be and the very nature of first matter. For although there can be no doubt that first matter depends on substantial form in order to be, we have shown in the last chapter that substantial form is distinct from the very nature of first matter. For just as clay and bronze cannot be without some shape, yet are, in their natures, distinct from every shape, so too first matter cannot be without some substantial form, yet is, in its nature, distinct from every substantial form.

[51] Et quia omnis definitio et omnis cognitio est per formam, ideo materia prima per se non potest cognosci vel definiri sed per comparationem ut dicatur quod illud est materia prima, quod hoc modo se habet ad omnes formas et privationes sicut aes ad idolum et infiguratum. *DPN*, ch. 2, vol. 43, p. 41.

[52] See also, *In Metaphys.*, Bk. 7, *lectio* 10, p. 439 (#1496), wherein St. Thomas says that "materia, quae principium est individuationis, est secundum se ignota, et non cognoscitur nisi per formam, a qua sumitur ratio

matter is unintelligible to us.[53] Hence, if first matter is to be known by us, it must be known by comparison (i.e., by proportion or analogy), as we observed in the last chapter.[54]

Because this is so, it seems that we are justified in maintaining that the nature of first matter is difficult for us to know and this is principally so precisely because there is hardly any nature there for us to know. To put this more formally, we might say that some things are difficult for us to know because their intelligibility is too great for our minds to grasp adequately. This is why it is difficult for us to know much about God and the angels from natural reason. On the other hand, some things are difficult for us to know because there is hardly any intelligibility on their part at all. This is why it is difficult for us to know distinctly what motion is, for example.[55] And, similarly, we can say that this is why it is difficult for us to know the nature of first matter. Thus, it seems that the failure to distinguish between first matter and substantial form is an easy mistake to make. For, in the end, there is hardly any nature at all that we are distinguishing from substantial form.

Finally, the third reason why the proponents of *Monism* and *Pluralism* fail to distinguish between first matter and substantial form pertains more to them as human knowers than it does to the nature of the object known. We discussed in chapters three and four that, as men, we come to understand things through our sense experience. Now our sense experience is not limited to our external senses, but includes our internal senses as well. Further, we depend on the images or

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universalis."

[53] On this matter, see, J. Nomand Marcotte, S.M., "The Knowability of Matter 'Secundum Se,'" *Laval Theologique et Philosophique* 1 (1945), pp. 103-118.

[54] Even the statement by St. Thomas, that first matter "secundum suam essentiam est potentia ad esse substantiale," helps to elucidate this claim. For in this description of what first matter is according to its essence, we find a reference to "esse substantiale" which is given to matter thanks to substantial form.

[55] See *In Metaphys.*, Bk. 2, *lectio* 2, p. 98 (#280).

phantasms in our internal senses not only in order to come to understand things, but also to attend to the things which we already know. Regarding this point, St. Thomas writes:

> ...the phantasm is a principle of our knowledge such that it is that from which our intellectual operation begins. [Further], it does not pass away, but remains as a foundation of our intellectual operation. Just as the principles of demonstration must remain in the whole process of scientific knowing, so phantasms compare to the intellect as objects in which it grasps everything that it grasps, either through perfect representation or through negation.[56]

But given this, it is clear that we can be led astray by our imaginations, if we attend unduly to the images that we have in mind when we think about the *principia naturae*. For example, if we attend too much to the image of a shape or some other image, while attempting to understand the way in which substantial form is in a substance, we will fall into certain errors. Commenting on this sort of mistake, St. Thomas states:

> ...some have posited that the soul can be considered in two ways, either according to its essence, or insofar as it is a certain potential whole. If we consider it in the first way, they say that it itself is not in the whole body, but rather in some part of the body, namely the heart, and through the heart it vivifies the whole body through vital spirits proceeding from the heart. If we consider the soul in the second way, the soul is thought to be a certain power put together from all of the particular powers. Thus, the whole soul is in the whole body, but the whole soul is not in every part of the body. Thus, as the Philosopher says, the parts of the soul stand to the parts of the body as the whole soul stands to the whole body. Hence, if the eye were an animal, the power of sight would be its soul. But the cause of this position is a twofold false imagination. One [false imagination] is that they have imagined the soul to be in the body as in a place, as if it were only a mover, and not a form, just as a sailor is in a ship. The other [false imagination] is that they have imagined the simplicity of the soul to be after the mode of a point, that is, as something indivisible having an indivisible position. And each of these is foolish. And, thus,

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[56] ...phantasma est principium nostrae cognitionis ut ex quo incipit intellectus operatio, non sicut transiens, sed sicut permanens ut quoddam fundamentum intellectualis operationis; sicut principia demonstrationis oportet manere in omni processu scientiae, cum phantasmata comparentur ad intellectum ut obiecta, in quibus inspicit omne quod inspicit vel secundum perfectam repraesentationem vel per negationem. *In de Trin.*, q. 6, a. 2 *ad 5um*, vol. 50, p. 166.

it must be said with Augustine that, considered according to its essence, the whole soul is in every part of the body. Albert says the same. Nevertheless, if we take the soul according to the totality of its powers, the whole soul is not [in the every part of the body]. For in this way the whole is in the whole animal. And the reason for this is because there is no place which a simple substance has except according to the relation that it has to the body. But the soul compares to the body as its formation from which the whole body and every one of its parts has existence, as from a substantial form. Nevertheless, not all parts of the body share in its powers. Hence, there are some powers by which a bodily organ cannot be perfected, as in the case of the intellectual powers. But there are others which are able to be the perfections of bodies. Nonetheless, the soul does not give all of these to every part of the body, since not every part of the body is of the same harmony and mixture; and nothing is received into something except according to the proportion of the receiver. And, therefore, the ear or the eye does not receive the same perfection from the soul, while, nevertheless, each part receives existence. Whence, if the soul is considered insofar as it is a form and essence, the whole is in every part of the body. But insofar as it is a mover according to its powers, the whole is not in the whole, but in different parts according to different powers.[57]

This text makes evident that, through attempting to imagine the rational soul or the substantial form of a man, certain philosophers were led to deny that, according to its essence, the whole soul is in

[57] ...quod quidam posuerunt animam dupliciter posse considerari: aut secundum suam essentiam, aut secundum quod est quoddam totum potentiale. Si primo modo, sic dicebant, ipsam non esse in toto corpore, sed in aliqua parte ejus, scilicet corde, et per cor vivificare totum corpus per spiritus vitales procedentes a corde. Si secundo modo, sic anima consideratur ut quaedam potentia integrata ex omnibus particularibus potentiis; et sic tota anima est in toto corpore, et non tota in qualibet parte corporis: immo, sicut dicit philosophus, partes animae se habent ad partes corporis sicut tota anima ad corpus totum; unde si pupilla esset animal, visus esset anima ejus. Hujus autem positionis causa, fuit duplex falsa imaginatio: una est, quia imaginati sunt animam esse in corpore sicut in loco, ac si tantum esset motor, et non forma, sicut est nauta in navi; alia est, quia imaginati sunt simplicitatem animae esse ad modum puncti, ut sit aliquid indivisibile habens situm indivisibilem. Et utrumque horum stultum est. Et ideo dicendum cum Augustino, quod anima secundum essentiam suam considerata, tota est in qualibet parte corporis. Idem dicit Albertus. Non tamen tota, si accipiatur secundum totalitatem potentiarum; sic enim est tota in toto animali. Et ratio hujus est, quia nulli substantiae simplici debetur locus, nisi secundum relationem quam habet ad corpus. Anima autem comparatur ad corpus ut ejus formatio a qua totum corpus et quaelibet pars ejus habet esse, sicut a forma substantiali. Et tamen potentias ejus, non omnes partes corporis participant; immo sunt aliquae potentiae quibus non est possibile perfici aliquid corporeum, sicut potentiae intellectivae; aliae autem sunt, quae possunt esse perfectiones corporum, non tamen eas omnes influit anima in qualibet parte corporis, cum non quaelibet pars corporis sit ejusdem harmoniae et commixtionis; et nihil recipitur in aliquo nisi secundum proportionem recipientis; et ideo non eamdem perfectionem recipit ab anima auris et oculus, cum tamen quaelibet pars recipiat esse. Unde si consideretur anima prout est forma et essentia, est in qualibet parte corporis tota; si autem prout est motor secundum potentias suas, sic est tota in toto, et in diversis partibus secundum diversas potentias. *In Sent.*, Bk. 1, d. 8, q. 5, a. 3, vol. 1, pp. 233-234.

every part of the body. These thinkers were led to this, says St. Thomas, because of a twofold false imagination. First, rather than understanding the soul to be in the body as form is in matter, these thinkers imagined the soul to be in the body the way in which the placed is in a place.[58] Second, instead of understanding that "there is no place which a simple substance has except according to the relation that it has to the body," these thinkers imagined the simplicity of the soul to be like the simplicity of a point.[59] Hence, these thinkers concluded that, like a point, the soul must have one determinate and indivisible position within the body.

Now, not surprisingly, similar errors can be made if we attend excessively to our images while considering the nature of first matter. This is evident enough from our own internal experience. For, whenever we attempt to imagine first matter, we inevitably form an image of some bodily substance(s). Hence, if we judge that our images provide us with an adequate representation of the nature of first matter, we will unfailingly maintain that first matter consists in some bodily

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[58] Thus, it seems that these thinkers at least mixed up the first and fifth principal meanings of "in." Regarding the eight principal meanings of "in" and their order, see *Physics*, Bk. 4, ch. 3 as well as *lectio* 4 from St. Thomas's *In Phys.*, Bk. 4, vol. 2, p. 155.

[59] Although both first matter and substantial form (and, hence, all souls) are simple in some way, they do not have the simplicity which is proper to God. Addressing this, St. Thomas writes: "omne quod procedit a Deo in diversitate essentiae, deficit a simplicitate ejus. Ex hoc autem quod deficit a simplicitate, non oportet quod incidat in compositionem; sicut ex hoc quod deficit a summa bonitate, non oportet quod incidat in ipsam aliqua malitia. Dico ergo quod creatura est duplex. Quaedam enim est quae habet esse completum in se, sicut homo et hujusmodi, et talis creatura ita deficit a simplicitate divina quod incidit in compositionem. Cum enim in solo Deo esse suum sit sua quidditas, oportet quod in qualibet creatura, vel in corporali vel in spirituali, inveniatur quidditas vel natura sua, et esse suum, quod est sibi acquisitum a Deo, cujus essentia est suum esse; et ita componitur ex esse, vel quo est, et quod est. Est etiam quaedam creatura quae non habet esse in se, sed tantum in alio, sicut materia prima, sicut forma quaelibet, sicut universale; non enim est esse alicujus, nisi particularis subsistentis in natura; et talis creatura non deficit a simplicitate, ita quod sit composita. Si enim dicatur, quod componitur ex ipsa sua natura et habitudinibus quibus refertur ad Deum vel ad illud cum quo componitur, item quaeritur de illis habitudinibus utrum sint res, vel non: et si non sunt res, non faciunt compositionem; si autem sunt res, ipsae non referuntur habitudinibus aliis, sed se ipsis: quia illud quod per se est relatio, non refertur per aliam relationem. Unde oportebit devenire ad aliquid quod non est compositum, sed tamen deficit a simplicitate primi: et defectus iste perpenditur ex duobus: vel quia est divisibile in potentia vel per accidens, sicut materia prima, et forma, et universale; vel quia est componibile alteri, quod divina simplicitas non patitur." *In Sent.*, Bk. 1, d. 8, q. 5, a. 1, vol. 1, pp. 226-227.

substance(s) as do the proponents of *Monism* and *Pluralism*.[60] Lest we place ourselves in the company with those whom St. Thomas describes as "*non valentes imaginationem transcendere*,"[61] we must realize that it is not through "perfect representation" that our images give us a certain purchase on the natures of the *principia naturae*, but rather "through negation." As we noted in chapter three, it belongs to the mathematician to resolve his judgements to what is in the imagination, while the natural philosopher must resolve his judgements to what is in known to us from our sense experience.

In keeping with what has been said, Fr. Dewan has the following astute and succinct way of stating the matter:

> Substance is an object of intellect and not of sense, save *per accidens*. It is the intellect which "reads the interiors of things." It takes deep penetration to consider adequately the principles of generable and corruptible substance, the substantial form and primary matter, items that Aristotle and St. Thomas spoke of as requiring "a difficult and lofty enquiry" [*altissimam speculationem et difficilem*]. There is a presocratic lurking in the imaginations of us all. We must be on our guard.[62]

Indeed, we have just observed some of the principal reasons why a proper inquiry into the *principia naturae* involves significant difficulty. And we might further agree with St. Thomas that such an

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[60] Speaking about the role of the imagination in our judgements about natural things, Marie George says: "Imagination cannot be relied upon for the judgement of natural things, since it can represent things as not existing in sensible matter and, also, as existing in sensible matter but other than they are. This latter way of using the imagination is what led Anaxagoras into the error of affirming that change comes about because everything is in everything else in act, but hidden. Other thinkers, trusting to the imagination's ability to represent things as not existing in sensible matter, treat natural entities as if they were mathematical ones, maintaining, for instance, that place is a space coequal to the dimensions of a body (instead of the limit of what contains)." From her, "Imagination as Source of Falsehood According to Aquinas," *Proceedings of the American Catholic Philosophical Association*, 68 (1993), p. 194.

[61] See, for example, *ST* I, q. 90, a. 1, vol. 5, p. 385.

[62] Fr. Lawrence Dewan, O.P., "St. Thomas and Hylomorphic Ontology," p. 15. The text from St. Thomas that Fr. Dewan has in mind is from *In Phys.*, Bk. 4, *lectio* 3, vol. 2, p. 153. It reads: "...tam materia quam forma habent altissimam speculationem et difficilem; et non est facile etiam cognoscere unum eorum sine altero."

inquiry is "lofty" both because it requires us to transcend properly our imaginations and the images therein, and because this inquiry is only finally completed by the highest science (i.e., metaphysics). As St. Thomas notes, the reason for the latter is that only the metaphysician is capable of studying form as form.[63] Hence, while it belongs to the natural philosopher to begin the study of the *principia naturae*, and to do so with a certain amount of determination, it belongs to the metaphysician to bring this study to its proper completion.

Lastly, a natural result of the difficulties entailed in properly understanding the *principia naturae* is that, as Fr. Dewan puts it, "the presocratics, like the poor, we have always with us."[64] In other words, because of the aforesaid difficulties involved in knowing what first matter is (and, by implication, what substantial form is), both on the part of first matter itself and on the part of the human knower, it is quasi-natural that many will fall into some form of *Monism* or *Pluralism* when attempting to understand the *principia naturae*. In keeping with this, we pointed out in chapter two that even eminent scientists such as Heisenberg, Einstein, and Weinberg (and perhaps many others as well) can be considered to be, as Fr. Dewan terms them, "contemporary Presocratics."[65]

At this point, then, we can say that we have completed what we set out to accomplish. First, we made known, in terms of a specific understanding of the *principia naturae* themselves, what is in fact occurring when this substance of this kind becomes that substance of that kind. Second we

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[63] See, for example, the following text from *In Phys.*, Bk. 1, *lectio* 15, vol. 2, p. 54: "Et ideo dicit [i.e., Aristoteles] quod de principio formali, utrum sit unum vel plura, et quot et quae sint, pertinet determinare ad philosophiam primam, et usque ad illud tempus reservetur: quia forma est principium essendi, et ens inquantum huiusmodi est subiectum primae philosophiae; sed materia et privatio sunt principia entis transmutabilis, quod a philosopho naturali consideratur. Sed tamen de formis naturalibus et corruptibilibus in sequentibus huius doctrinae determinabitur."

[64] *St. Thomas and Form as Something Divine in Things*, p. 29.

[65] *Form and Being*, p. 101.

have showed that only a specific understanding of the natures of first matter, substantial form, and the privation of substantial form is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind amongst the substances involved in substantial becoming, and c) the reality of substantial becoming itself. Third, following the lead of Aristotle and St. Thomas, we have provided a definitive resolution to the difficulty raised by *Monism* and *Pluralism*. Fourth and finally, we have explained why the proponents of *Monism* and *Pluralism* have erred in their understanding of the *principia naturae*.

In conclusion, let us briefly reflect on the way in which both chapters six and seven have traveled over the *via resolutionis et via compositionis*, respectively. In order to do this, let us recall the following text from St. Thomas:

> In the pursuit of our knowledge of composite things the first work is the way of resolution, namely, that we divide the composite down to indivisible parts. But afterwards the way of composition is necessary whereby from the indivisible principles already known we judge concerning those things which are caused by the principles.[66]

The question then becomes: How have we done in chapters six and seven what St. Thomas has here described? To answer this, we should note that in chapter six we started our examination of the principles of substantial becoming by focusing on what we know from our common experience, namely, that this substance of this kind becomes that substance of that kind. Contained in this, of course, is our grasp of the substantial unity of the substances involved substantial becoming, their differences in kind, and the reality of substantial becoming itself. Thus, in chapter six, beginning from what we know from our common experience, we resolved the substances involved in

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[66] "...ad cognitionem compositorum primo opus est via resolutionis, ut scilicet dividamus compositum usque ad individua. Postmodum vero necessaria est via compositionis, ut ex principiis indivisibilibus iam notis diiudicemus de rebus quae ex principiis causantur." *In Polit.*, Bk. 1, *capitulum* 1/a, vol. 48, p. A 73.

substantial becoming into the first principles and causes from which they both come to be and are (both *per se* and *per accidens*), *id est*, first matter, substantial form, and the privation of substantial form. Furthermore, in chapter six we attempted to examine the natures of these same principles and causes. Thus, we might say that in chapter six we divided (i.e., we resolved) the composites (i.e., the natural substances most known to us) down to their indivisible parts (i.e., first matter, substantial form, and the privation of substantial form).

Now in chapter seven one of the things that we attempted to do was to know the substantial unity of the natural substances involved in substantial becoming, their differences in kind, and the reality of substantial becoming itself in light of first matter, substantial form, and the privation of substantial form. In other words, after we resolved the natural substances most known to us in to the first principles and causes from which they both come to be and are, we then attempted to judge the attributes or properties of these substances in light of the inward principles and causes (i.e., first matter, substantial form, and the privation of substantial form).[67] Thus, in chapter seven, we can

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[67] Duane Berquist illuminates the sort of thing we have in mind here. He writes: "In demonstrations, it also happens that what comes before in our knowledge may depend in some way upon what comes after. This is because our intellect proceeds from the more known to the more knowable. An effect is less knowable than its cause in that the effect is what is on account of its cause and not vice-versa. Yet the effect is usually more known. Hence, it is necessary for us to proceed from the existence of the effect to that of the cause although, when we then know the cause, it (the cause) can manifest something about <u>why</u> the effect is the way we know it to be. For example, we know the existence of substantial change before we know the existence of prime matter and substantial form although these latter must be known before we can know why substantial change is possible. Or, the existence of order in nature is known before the existence of an intellect that caused it although this Intellect must be known before we know why there is an order in nature. Or, we know our thinking before our intellect, and our intellect before our soul, and our soul before God, although the latter is in each case a cause of the former. If our intellect could begin with what was most knowable – the cause – there would be no necessity of what comes first in our knowledge depending in some way upon what comes after." From his, *Descartes and the Way of Proceeding in Philosophy*, unpublished doctoral dissertation (Quebec: Laval University, 1964), p. 133. Cf. *In de Trin.*, q. 5, a. 1 *ad 9um*, vol. 50, p. 141.

Fr. William Wallace, O.P. maintains that this reasoning from the fact of substantial becoming to the natures of first matter and substantial form, which Duane Berquist speaks of is an *a posteriori* demonstration from a formal effect to the nature of the formal cause and its proper subject. See his, *From a Realist Point of View: Essays on the Philosophy of Science* (Washington, D.C.: University of America Press, 1979), 139-142.

say that from our knowledge of the indivisible principles (i.e., first matter, substantial form, and the privation of substantial form) we judged concerning those things that are caused by the principles (i.e., the substantial unity of the natural substances involved in substantial becoming, their differences in kind, and the reality of substantial becoming itself). As a result, it is clear that in chapter six we traveled over the *via resolutionis* while in chapter seven we traversed the *via compositionis*.

## 7. Résumé

By traveling over the *via compositionis* in this chapter, we endeavored to 1) make known, in terms of a specific understanding of the *principia naturae* themselves, what in fact occurs when this substance of this kind becomes that substance of that kind, 2) show that only a specific understanding of the natures of first matter, substantial form, and privation is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind between the substances involved in substantial becoming, and c) the reality of substantial becoming itself, 3) provide a definitive resolution to the difficulty raised by *Monism* and *Pluralism*, and 4) explain why the proponents of *Monism* and *Pluralism* have erred in their understanding of the *principia naturae*.

Regarding the first of these points, we observed that whenever this substance of this kind becomes that substance of that kind, first matter *acquires* a substantial form which it previously lacked. While in many substantial becomings it is true to say that the substantial form *acquired* by first matter is *educed* from the potency of first matter, this cannot be said in the case of the coming to be of a man.

Furthermore, concerning the second point, we showed that just as no other principle besides first matter, substantial form, and the privation of substantial form is needed in order to explain adequately the substantial unity of the substances involved in substantial becoming, the differences in kind between these substances, and the reality of substantial becoming itself, so too no other principles would be sufficient to adequately account for these same givens from our common experience.

In resolving the difficulty raised by *Monism* and *Pluralism*, we saw that the fundamental error involved in both of these positions is a failure to distinguish the *per se* from the *per accidens*. For the proponents of *Monism* and *Pluralism* failed to distinguish first matter itself from the substantial form which belongs to the substance to which the substantial becoming is attributed and, therefore, they failed to see any distinction between first matter and the substance of which it is a part (i.e., the substance to which the substantial becoming is attributed).

Lastly, given both the natures of the *principia naturae* themselves and our natural mode of human knowing, we showed that the error made by the proponents of *Monism* and *Pluralism* is one which is quite difficult to avoid. Hence, it should not be surprising if, as Fr. Dewan puts it, "the presocratics, like the poor, we have always with us." And we ended this chapter by briefly reflecting on how in the previous chapter and in this one we have traveled over the *via resolutionis* and the *via compositionis*, respectively.

## Chapter Eight: Objections and Replies

In these final two chapters we shall examine four important and relatively recent articles which have raised significant objections against St. Thomas's understanding of the *principia naturae*. All four of these articles have been penned by philosophers who maintain both that part of St. Thomas's understanding of the *principia naturae* must be retained and that some other part(s) must be rejected. In this chapter we shall examine two articles which raise objections principally against St. Thomas's understanding of the nature of first matter. In the next chapter, we shall examine two more articles which, by contrast, raise objections principally against St. Thomas's understanding of the nature of substantial form.

### 1. John Kronen's Objections against John of St. Thomas and St. Thomas's Teachings on the Nature of First Matter

To begin, let us examine the view of the nature of first matter set forth by John Kronen in his article, "The Substantial Unity of Material Substances according to John Poinsot."[1] In this article, John Kronen seeks to show that John of St. Thomas's understanding of substantial form, which seems to be essentially the same view of substantial form which has been reasoned to in these pages, is helpful insofar as it shows the inadequacies of both a "structuralist" or "relational" view of substantial form and a reductive materialistic understanding of living things.[2]

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[1] John Kronen, "The Substantial Unity of Material Substances according to John Poinsot," *The Thomist* 58 (1994): 599-615. John Poinsot is also known as John of St. Thomas. Hereafter we shall call him by his religious name.

[2] In Kronen's words, those who hold to a structuralist or relational view of substantial form "view form, not as one of the parts constituting the composite substance, but as an intimate relation of the parts which produces new, emergent properties" (p. 602). Illustrating this with an example taken from Leclerc, Kronen goes on to say: "Hence, Leclerc would say that in addition to the parts of the water [i.e., the hydrogen atoms and the oxygen atom]

Now amidst arguing for these conclusions, Kronen also presents his own view of the nature of first matter. He mentions that it is because John of St. Thomas focuses on the kind of unity proper to substance that he is led to maintain that the nature of first matter is pure passive ability. Regarding this, Kronen writes:

> It is the same sort of emphasis on the unity of substance that led Poinsot to insist that substantial form cannot be a relation between substances binding them together, but must be a constituent, indeed the primary constituent, of a substance. From this it follows that what form determines in giving being to a composite substance is not a plurality of already existing substances, but primary matter, which is pure potency. Substantial form spreads this matter out, so to speak, giving rise to the various parts of composite substances, but at the same time unifying them into one substantial whole: "...the integral parts are actual beings through one form of the whole which is of all the parts; for each part does not have its own form and therefore it is drawn to the same being of the whole."[3]

But, after stating this, Kronen goes on to disagree with John of St. Thomas's (as well as St. Thomas's) understanding of the nature of first matter. He states:

> Some philosophers would not agree with Poinsot's reasoning with respect to prime matter. Poinsot holds prime matter must be a pure potency having no being of its own separate from form. If it did have some being of its own it would be itself a substance according to Poinsot and so any form informing it could only give accidental, not substantial, being. But for many philosophers it is hard to conceive of the various parts of composite substances as being given their *entire* being by a form which makes the substance one composite substance of a certain sort. My heart is not the same as my liver, and yet both seem essential to me, since without them I would not exist. This means they are substantial, not accidental. It does not seem

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there is a structure or relation which, in intimately relating hydrogen and oxygen, gives rise to the properties of the water. This form is reflected in the formula for water which specifies that water is two parts hydrogen and one part oxygen. This very relation is, for Leclerc, the substantial form of water" (p. 603).

Reductive materialism, on the other hand, "holds that composites such as animals or humans are not really substances but aggregates which, insofar as they are aggregates, have certain properties that their parts lack. These properties do not flow from any higher substantial form than those of the parts" (p. 612). Kronen then manifests this position using the example of four oarsmen propelling a canoe. He says: "The action of propelling the canoe is a composite action which does not reside in any of the oarsman as such, nor in the canoe, but the subject of the action is not some individual over and above the oarsmen and the canoe: it is rather all of them taken as an aggregate, not a substance" (p. 612).

[3] *Ibid.*, p. 607.

> their *distinct* being, however, could be given by the *single* substantial form which unifies me into a single substance. For how could form, as a principle that gives unity to the whole of the composite, also give distinct being to the liver or the heart?[4]

Here Kronen makes that point that if the first matter in a living substance were pure passive ability, then the living substance's single substantial form would have to give both unity to the whole living substance and distinct kinds of being to the various parts of the living substance. But, according to Kronen, it is impossible for a single principle to account for both the unity of and the distinction amongst the parts of a living substance. Hence, it follows that the first matter in a living substance cannot be pure passive ability. Stating this same argument more formally, Kronen writes:

> (1) Every integral part of a substance is really distinct from every other integral part of that substance by its own entity.
> (2) If (1), then the integral parts of a substance are not constituted by prime matter alone, nor by prime matter and a single form.
> (3) The integral parts of a substance are not constituted by prime matter alone, nor by prime matter and a single form.
> (4) If (3), then the integral parts of a substance are either not constituted by prime matter at all or they are constituted by prime matter and a plurality of forms.
> (5) If they are constituted by prime matter and a plurality of forms, then the forms that partially constitute them are either substantial or accidental.
> (6) The integral parts of a substance are not accidents.
> (7) If (6), then the integral parts of a substance are not constituted by accidental forms.
> (8) The integral parts of a substance are not constituted by accidental forms.
> (9) The integral parts of a substance are either constituted by prime matter and a plurality of substantial forms or they are not constituted by prime matter at all.
> (10) If (9), then the material out of which a composite substance is made is a plurality of lesser substances.
> (11) The material out of which a composite substance is made is a plurality of lesser substances.[5]

In addition to this argument, Kronen both anticipates an objection to his position and provides

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[4] *Ibid.*, pp. 607-608.

[5] *Ibid.*, p. 608.

further reasons for the plausibility of his understanding of the nature of substantial form. Regarding this he maintains the following:

> One might object that the view of form here presented in no better than the view of form as a relation. For on this view, as on the relational view of form, form would immediately inform already existing substances. Yet there is this difference between the two views: on the view I am defending, what relates the simpler substantial parts of a more complex substance is not a relation but a substantial form. And one might conceive that such a form, while it leaves the lesser forms of the substantial parts of the composite intact, robs them of their independence, of their modes of existing *in se*, and makes them to exist as constituent parts of the composite. Such a form, then, would not be parasitic on the lesser substances it informs, as in the relational view, but would be a substantial quality, as it were, giving new substantial unity to the parts of the composite and bestowing powers of a higher order upon the composite than those of the lesser substances that constitute the matter of the composite.
>
> This seems possible because the forms of substances below the level of animal life are very imperfect and hence it may be that they could come together to form the proximate matter for a form of a more perfect order which would further complete and perfect them. In this I am, I think, in agreement with the school of Scotus and Occam. This view further seems possible in light of the incarnation. In the incarnation a complete human nature was, as it were, stripped of its natural mode of independent existence, and was given such a mode of existence by the divine nature into which it was assumed. In this way, although it retained its own human nature, it did not subsist by that nature but by the nobler nature to which it was joined. Anyone, therefore, who admits the possibility of the incarnation must admit the possibility that lesser substances can be stripped of their substantial independence by forms of a nobler nature than their own, consequently being given substantial unity and existence as parts of the higher composite which they, along with the substantial form of the composite, constitute.[6]

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[6] *Ibid.*, pp. 609-610. Concerning his understanding of the nature of substantial form, Kronen also says: "Nevertheless, even if we suppose that matter cannot be pure potency for the sake of argument, I think that Poinsot's reasoning for the existence of substantial forms conceived as constituent parts can still be defended. This is because even if the subject form informs is not held to be pure potency, but a plurality of distinct substances arranged in a certain order, form is necessary to give unity to these substances and to bind them together as parts of a single substance. This form, unifying the composite substance, cannot be a mere relation, for relations, of all properties have the least degree of ontological thickness. Nor could this form be any sort of accident since accidents can only give accidental being. It must therefore be a principle in the substantial order, making the composite of it and the lesser substances it informs into something *per se* one. In so doing it will be the principle of substantial being of the composite, since that which gives substantial being must be something in the substantial order, and since substantial unity, as such, follows upon substantial being. Thus, the principle of the substantial unity of a thing must be identical with the principle of the substantial being of a thing. But the substantial principle of being of a thing simply is the substantial form of that thing" (*Ibid.*, pp. 608-609).

In this text Kronen makes clear how he is conceiving of the causality of both the first matters and substantial form. The former, which are a plurality of distinct lesser substances, both stand under substantial form as its subjects and serve as the materials which are able to be the constituent parts of some higher substance. The latter, which consists in a "substantial quality," forms the first matters, and in so doing, both removes their modes of existing as independent substances and bestows on them substantial unity and various powers of a higher order. Now here it is essential to note that, according to Kronen, when a substantial form informs these first matters, the latter do not cease to be the substances which they were, or better, they do not lose their substantial forms. Rather, these many lesser substances, which are the first matters, retain their substantial forms and merely lose their modes of existing as independent substances. What happens here, claims Kronen, is not unlike what occurred when the Eternal Word became man. Hence, he says, whoever maintains that the Incarnation is possible, must maintain that this view of the nature of the first matters and substantial form is possible as well.

## 2. Replies to Kronen's Objections

Having seen the essence of Kronen's objections against John of St. Thomas and St. Thomas's understanding of the *principia naturae*, we shall now proceed to answer his objections. In so doing, first we shall refute Kronen's argument which concludes that "the material out of which a composite substance is made is a plurality of lesser substances." Thereafter, we shall show why Kronen's understanding of the nature of substantial form is defective. Lastly, *contra* Kronen, we shall show that belief in the Incarnation does not necessitate belief in the possibility of Kronen's position.

Regarding the first of these matters, it is clear that Kronen's argument is sound only if all of

its premises are true. Let us begin, then, by examining the first two premises in this argument. It is evident that these first two premises are themselves the premises of the first conditional syllogism in Kronen's larger argument. The syllogism in question runs thus:

> If every integral part of a substance is really distinct from every other integral part of that substance by its own entity, then the integral parts of a substance are not constituted by prime matter alone, nor by prime matter and a single form. But every integral part of a substance is really distinct from every other integral part of that substance by its own entity. Therefore, the integral parts of a substance are not constituted by prime matter alone, nor by prime matter and a single form.

Looking at the first premise in this syllogism, it seems that in order for the consequent to follow necessarily from the antecendent, it is necessary to maintain that the integral parts of a substance must differ from each other as one substance differs from another substance. In other words, it is only on the condition that a man's heart, liver, and other integral parts differ from each other as one substance differs from another substance, that it would necessarily follow that his heart, liver, and other integral parts are constituted neither by prime matter alone (since each integral part would be constituted by prime matter and a substantial form) nor by prime matter and a single form (since each integral part would have its own substantial form).

Yet, to maintain that the integral parts of a substance differ from each other as one substance differs from another substance is finally to deny that things such as men, horses, and oak trees are in fact substances. For the fact that two or more things differ from each other as one substance differs from another substance means that the two or more things in question must themselves be substances. Hence, Kronen's position seems to imply, perhaps unwittingly, that things which Kronen takes to be substances are, in fact, only collections of substances put together and ordered

in a certain way.[7]

Now while it is false to say that a man's heart, liver, and other integral parts differ from each other as one substance differs from another, it is true to say that these same things differ from each other as one part of a substance differs from another part of the same substance. Further, as parts of the substance which is a man, the heart, liver, and other integral parts depend on the whole for their being and operation. A sign of this is that as soon as any of these parts is separated from the substance to which they belong, it immediately loses both its being and operation.[8]

Kronen is obviously correct in stating that some parts of a substance (e.g., heart, liver, etc.) are essential to the being of the substance. Hence, as he says, "they are substantial, not accidental," or, as St. Thomas puts it, they are "parts of the essence" of the substance to which they belong.[9]

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[7] That Kronen takes things such as men, horses, and oak trees to be substances is clear from something that he says close to the beginning of his article. He writes: "Some might question whether there are any composite substances; however, supposing, as common sense does, that such things as trees or cats are substances, it seems that there are composite substances. Such composite substances must be made out of (1) certain parts which are (2) structured in a certain way by an overall form. That a composite must be made out of parts seems self-evident since without such parts it would be simple. Further, that these parts must be determined in some way seems clear since, were they not, then the parts would remain a heap and would not constitute a composite substance that is *per se* one" (*Ibid.*, pp. 601-602).

[8] St. Thomas makes this very point in many texts. See, for example, *ST* I, q. 76, a. 8, vol. 5, p. 232 and *SCG*, Bk. 2, ch. 72, vol. 13, pp. 456-457. One might be tempted to think that the practice of organ transplantation is evidence against this. In the next chapter, however, we shall show that such is not the case.

[9] Totum etiam non a quibuslibet partibus abstrahi potest. Sunt enim quaedam partes, ex quibus ratio totius dependet, quando scilicet hoc est esse tali toti quod ex talibus partibus componi, sicut se habet syllaba ad litteras et mixtum ad elementa; et tales partes dicuntur partes speciei et formae, sine quibus totum intelligi non potest, cum ponantur in eius diffinitione. Quaedam vero partes sunt quae accidunt toti, in quantum huiusmodi, sicut semicirculus se habet ad circulum. Accidit enim circulo, quod sumantur per divisionem duae eius partes aequales vel inaequales vel etiam plures; non autem accidit triangulo, quod in eo designentur tres lineae, quia ex hoc triangulus est triangulus. Similiter etiam per se competit homini quod inveniatur in eo anima rationalis et corpus compositum ex quattuor elementis, unde sine his partibus homo intelligi non potest, sed haec oportet poni in definitione eius; unde sunt partes speciei et formae. Sed digitus, pes et manus et aliae huiusmodi partes sunt post intellectum hominis, unde ex eis ratio essentialis hominis non dependet; et homo sine his intelligi potest. Sive enim habeat pedes sive non, dummodo ponatur coniunctum ex anima rationali et corpore mixto ex elementis propria mixtione, quam requirit talis forma, erit homo. Et hae partes dicuntur partes materiae, quae non ponuntur in diffinitione totius, sed magis e converso. Et hoc modo se habent ad hominem omnes partes signatae, sicut haec anima et hoc corpus et hic unguis et hoc os et huiusmodi. Hae enim partes sunt quidem partes essentiae Sortis et Platonis, non autem hominis,

However, that these sorts of parts are essential to the being of a substance in no way implies that they differ from each other as one substance differs from another substance, as Kronen would have it. Rather, it merely implies that the life or being of a substance is more dependent on these parts than on its other parts.

In connection with this, we noted above that, according to Kronen, it is impossible for a single substantial form to account for the many distinct parts of a given substance. For, to hold otherwise would be to posit that the substantial form in question is both one and many or, at least, that the said substantial form has both a oneness and a manyness about it. Now, in response to this, we maintain that while it is impossible for something to be both one and many in the same way, nothing hinders something from being both one and many in different ways. For example, line AB is one line in act, but many lines in ability. Similarly, the road from Athens to Thebes and the road from Thebes to Athens are one in subject, but two in account.

Applying this distinction, then, to the substantial form known as the soul, we maintain with St. Thomas that the soul is one or simple in its essence, while it is many or manifold in its power. Regarding this, he writes:

> ...the perfectible must be proportionate to its perfection. But although the soul is a simple form, nevertheless, it is manifold in its power insofar as diverse powers flow forth from its essence. Hence, the body which is proportioned to it must have distinct parts in order to receive the diverse powers [of the soul]. Wherefore, the soul is said to be the act of an organized body.[10]

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in quantum homo; et ideo potest homo abstrahi per intellectum ab istis partibus, et talis abstractio est universalis a particulari. *In de Trin.*, q. 5, a. 3, vol. 50, pp. 148-149. See also *In Metaphys.*, Bk. 7, *lectio* 11, p. 447 (#1531).

[10] ...perfectibile debet esse proportionatum suae perfectioni. Anima autem quamvis sit forma simplex, est tamen multiplex in virtute, secundum quod ex ejus essentia oriuntur diversae potentiae; et ideo oportet corpus proportionatum sibi habere partes distinctas ad recipiendum diversas potentias; unde etiam anima dicitur esse actus corporis organici. *In Sent.*, Bk. 1, d. 8, q. 5, a. 3 *ad 2um*, vol. 1, p. 234.

And again:

> And this belongs to the intellectual soul, that although it is one according to its essence, nevertheless, on account of its perfection, it is manifold in power. Therefore, in order [to exercise] its diverse operations it requires diverse dispositions in the parts of the body to which it is united. And, on account of this, we observe that there is a greater diversity of parts in the perfect animals than in the imperfect ones, and a greater diversity of parts in the imperfect animals than in plants.[11]

Moreover, St. Thomas's teaching here perfectly comports with what we established in the previous two chapters. For there we showed that it is in virtue of its one substantial form that every substance which comes to be is one substance of a determinate kind. Hence, it is owing to their respective substantial forms that Mr. Smith, this horse, and this oak tree are a man, a horse, and an oak tree respectively. But this implies that it is in virtue of the one substantial form which it has that every substance which comes to be has all of its parts, both essential and non-essential. Thus, it is thanks to their respective substantial forms that Mr. Smith, this horse, and this oak tree have these parts of a man, these parts of a horse, and these parts of an oak tree, respectively. As a result, since it is in virtue of the one substantial form that it has that every substance which comes to be has both its substantial being and unity, on the one hand, and its diversity of parts, both essential and non-essential, on the other hand, we are forced to maintain, with the Angelic Doctor, that the substantial form known as the soul is one or simple in its essence, but is many or manifold in its power.

From these observations, then, we must hold that Kronen's argument for the conclusion that,

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[11] Et hoc competit animae intellectivae, quae quamvis sit una secundum essentiam, tamen propter sui perfectionem est multiplex in virtute; et ideo, ad diversas operationes, indiget diversis dispositionibus in partibus corporis cui unitur. Et propter hoc videmus quod maior est diversitas partium in animalibus perfectis quam in imperfectis, et in his quam in plantis. *ST* I, q. 76, a. 5 *ad* 3*um*, vol. 5, p. 228. On this point, see also, *De anima*, q. 8 *ad* 14*um*, vol. 24, 1, p. 73 and *De malo*, q. 2, a. 9 *ad* 10*um*, vol. 23, p. 56.

"the material out of which a composite substance is made is a plurality of lesser substances," is not sound. For, as we have seen, the first premise of this argument is false as stated. That is, it is false to maintain that "every integral part of a substance is really distinct from every other integral part of that substance by its own entity," if one means by this, as Kronen seems to, that every integral part of a substance differs from every other part of that same substance in the way in which one substance differs from another substance. Thus, even if Kronen's conclusion does follow with necessity from his premises, it has not been shown to be true from the argument which he has provided.

Next, we must turn to a consideration of the defects in Kronen's understanding of the nature of substantial form. In examining Kronen's view of substantial form above, we observed that he takes substantial form to be a sort of substantial quality. In other words, substantial form is a certain quality of the substantial order which, "while it leaves the lesser forms of the substantial parts of the composite intact, robs them of their independence, of their mode of existing *in se*, and makes them to exist as constituent parts of the composite." Further, this substantial quality, he says, "giv[es] new substantial unity to the parts of the composite and bestow[s] powers of a higher order upon the composite than those of the lesser substances which constitute the matter of the composite."

Now both from these texts and from the others cited above, it is evident that Kronen is in fact positing that there are many substantial forms in every higher substance. That is, according to Kronen, we find in every man, horse, oak tree, and so forth, not only some substantial form which belongs to the whole as such, but also many other substantial forms which belong to the parts insofar as they are substances. For example, on Kronen's view, we find in Mr. Smith a substantial form which belongs to him as a whole as well as many other substantial forms which belong to his various

integral parts (i.e., a substantial form of his heart, a substantial form of his liver, and so on).[12]

It seems, then, that Kronen's understanding of the nature of substantial form involves something similar to Avicebron's position, which was briefly addressed in chapter six. Hence, St. Thomas's refutation of the doctrine of the plurality of substantial forms is applicable to Kronen's position as well. But in chapter six, we saw that St. Thomas's refutation of this error begins with the observation that the substantial form which first informs first matter makes it to be a substance or to be simply speaking. Therefore, every purported substantial form which thereafter comes to this substance only causes it to be in a certain respect or to be accidentally. Hence, every one of these purported substantial forms must be, in truth, an accidental form. So too, then, with Kronen's position. In other words, since, according to Kronen, the integral parts of a substance have their own substantial forms, it is necessary that whatever form comes to them be only an accidental form. Hence, on Kronen's view, the purported substantial forms which belong to men, horses, and oak trees as wholes are finally just accidental forms.[13] But from this it necessarily follows that men, horses, and oak trees are not, as such, genuine substances. This, however, is a conclusion which Kronen himself does not seem to admit.

From what has been said, it appears that Kronen's understanding of the nature of substantial

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[12] Perhaps what Kronen is rightly seeing here is that there are many incomplete or intermediate substantial forms which are contained in the power of the one substantial form whereby a man is a man. Once a man's parts are separated from him (e.g., his heart or liver), these parts come to be substances in their own rights with their own incomplete or intermediate substantial forms. For a fuller discussion of this, see the response to Terence Nichols's position in the following chapter.

[13] It may well be the case that these forms are the kind of accidental forms which St. Thomas calls forms of composition and order. For it is in virtue of the sorts of forms that Kronen is positing that the substances which are constituent parts of higher substances, such as men, horses, and oak trees, are put together and ordered in some way. There seems to be little or no difference, then, between Kronen's understanding of the substantial forms of higher substances as such and the form of a house as house.

form is defective in that it fails to distinguish properly between the nature of substantial form and the nature of accidental form. For, despite the fact that, on Kronen's view, the substantial forms of higher substances as such are merely accidental forms, nevertheless, he attributes to them some of the effects which belong properly to substantial form. As a result, it should be clear that Kronen's view of the nature of substantial form is finally untenable as a consistent position.

Lastly, we must examine Kronen's claim that belief in the possibility of the Incarnation necessitates belief in "the possibility that lesser substances can be stripped of their substantial independence by forms of a nobler nature than their own, consequently being given substantial unity and existence as parts of the higher composite which they, along with the substantial form of the composite, constitute." Is Kronen correct in making this claim?

In order to begin to answer this question, let us turn to the *Tertia pars* of the *Summa theologiae*, wherein St. Thomas addresses whether it is more fitting for a divine Person to assume human nature rather than some other created nature. Regarding this, St. Thomas writes:

> ...something is said to be "assumable" which is able to be assumed by a divine person. But this ability cannot be understood with respect to natural passive power which does not extend to that which transcends the natural order, as does the personal union of a creature with God. Hence, it remains that something is called "assumable" according to some fittingness for the aforesaid union. Now this fittingness is attained in human nature according to two things, namely, according to its dignity [i.e., the dignity of human nature] and according to its need [i.e., the need of human nature]. According to its dignity, because human nature, insofar as it is rational and intellectual, is made to attain to the Word in some way through its operation, namely, by knowing and loving Him. According to its necessity, because it was in need of restoration since it was subjected to original sin. But these two things belong to human nature alone. For the irrational creatures lack the fittingness of dignity, while the angels lack the fittingness of the aforesaid necessity. Hence, it remains that only human nature is assumable.[14]

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[14] ...aliquid assumptibile dicitur quasi aptum assumi a divina persona. Quae quidem aptitudo non potest intelligi secundum potentiam passivam naturalem, quae non se extendit ad id quod transcendit ordinem naturalem,

Here St. Thomas tells us that the ability that a created nature has to be assumed by God is not a natural ability. For natural ability, whether it be passive or active, does not pertain to what transcends the natural order. Yet, the ability that a created nature has to be assumed by God does transcend the natural order. For this ability is fulfilled in the personal union of the said created nature with God. Thus, it follows that the ability that a created nature has to be assumed by God is not a natural ability.

Once we see that this is so, Kronen's aforementioned claim becomes somewhat questionable. For while, from the fact of the Incarnation, it is made evident to us that God can assume a created nature to Himself, nevertheless, it is not made evident to us, from the fact of the Incarnation, that a more noble *created* substance can assume to itself the nature of less noble created substance. The possibility of the latter, then, still needs to be demonstrated. Hence, Kronen is incorrect in claiming that belief in the possibility of the Incarnation necessitates belief in the possibility of his position.[15]

In conclusion to our examination of Kronen's objections against John of St. Thomas and St. Thomas's understanding of the *principia naturae*, it is clear that we have done three things. First, we have refuted Kronen's argument which maintains that "the material out of which a composite substance is made is a plurality of lesser substances." Second, we have showed why Kronen's

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quem transcendit unio personalis creaturae ad Deum. Unde relinquitur quod assumptibile aliquid dicatur secundum congruentiam ad unionem praedictam. Quae quidem congruentia attenditur secundum duo in humana natura, scilicet secundum eius dignitatem; et necessitatem. Secundum dignitatem quidem, quia humana natura, inquantum est rationalis et intellectualis, nata est contingere aliqualiter ipsum verbum per suam operationem, cognoscendo scilicet et amando ipsum. Secundum necessitatem autem, quia indigebat reparatione, cum subiaceret originali peccato. Haec autem duo soli humanae naturae conveniunt, nam creaturae irrationali deest congruitas dignitatis; naturae autem angelicae deest congruitas praedictae necessitatis. Unde relinquitur quod sola natura humana sit assumptibilis. *ST* III, q. 4, a. 1, vol. 11, p. 74.

[15] It is worth noting that, even if Kronen's claim regarding the possibility of his position were true, this would still be insufficient to show that his position is in fact the case. For *a posse ad esse non valet illatio.*

understanding of the nature of substantial form is defective. And third, *contra* Kronen, we have showed that belief in the Incarnation does not necessitate belief in the possibility of Kronen's position. Now while we have not found much truth in Kronen's actual position, it is essential to note that, without the objections set forth by Kronen, we would not have seen as distinctly, as we have here, the fact that while the substantial forms in living things are one or simple in their essence, nonetheless, they are many or manifold in their power. Hence, our examination of Kronen's objections has certainly not been without merit.

### 3. Christopher Byrne's Objections against Aristotle and St. Thomas's Teachings on the Nature of First Matter

At this point, let us turn to a consideration of the second article to be addressed here. The article in question is Christopher Byrne's "Prime Matter and Actuality."[16] In this article Byrne attempts to show, *contra* St. Thomas, that first matter must be something more than pure passive ability. In his own words, Byrne writes:

> Contrary to the traditional doctrine of prime matter, I would argue that this ultimate substratum is not pure potentiality, but the matter of perceptible bodies, that is, the extended, divisible, and movable stuff out of which all perceptible substances are made. This is the case because subtracting from a perceptible substance all of its particular qualitative and quantitative properties, in particular all of the properties that give it a particular, definite size or shape, does not mean that it ceases to be an extended body.[17]

Further, Byrne attempts to show, through a threefold objection against "the traditional

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[16] Christopher Byrne, "Prime Matter and Actuality," *Journal of the History of Philosophy*, 33 (1995), pp., 197-224.

[17] *Ibid.*, p. 213.

doctrine," that his understanding of the nature of first matter is correct. In summary form, this threefold objection is as follows:

> Prime matter cannot be pure potentiality, and, at the same time, act as (1) the ultimate substratum of substantial change, (2) the ultimate subject underlying the essential and accidental properties of perceptible substances, and (3) the matter which individuates numerically distinct but formally identical substances. Its correlative formal cause cannot take over these roles, for they are inconsistent with the role of the formal cause as the defining feature of a substance, which can be found in several different individuals at once, and which is gained and lost in the process of substantial change. In short, the correlative formal cause of prime matter cannot, by itself, constitute the total nature and reality of any perceptible substance.[18]

Let us now examine each of the parts of this objection in turn. With respect to the first part of his objection, it is manifest that Byrne thinks that it is impossible for pure passive ability to be what underlies substantial change. Stating this part of the objection more fully, Byrne maintains:

> The trouble with this argument [i.e., the argument that if the material principle in substantial change had any determinate nature, then substantial change would be reduced to a kind of accidental change], however, is that it renders unintelligible the role of prime matter as a substratum of substantial change. Aristotle argues that all change must be understood in terms of a persisting substratum and a pair of opposed properties or attributes, one of which is lost and the other gained in the process of change. Prime matter is supposed to act as the substratum for the generation of the material elements. It is, however, impossible for prime matter to do this if it lacks any independent actuality, or determinate nature, of its own; if prime matter is nothing apart from some formal cause, then there really is no persisting substratum for these substantial changes. This is because prime matter, which is supposed to persist, is what it is by the end of the change by virtue of a formal cause which is different from the one that made it to be what it was at the beginning. In effect, in any change for which prime matter is the substratum, there is nothing which has persisted throughout, independent of the formal cause gained or lost in that change. Even if the change is thought to be instantaneous, the contradiction remains because now the substratum must be thought of as persisting up to the point at which its first formal cause is lost, and then as being immediately re-created by virtue of the new formal cause which comes into existence.[19]

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[18] *Ibid.*, p. 220.

[19] *Ibid.*, p. 204.

Anticipating a response to this part of his objection by defenders of the traditional doctrine, Byrne continues:

> The defenders of the traditional doctrine of prime matter might agree that prime matter has to have some reality of its own if it is to act as a substratum of substantial change, and that this reality cannot be understood in terms of the formal cause gained or lost during that change. As a result, some commentators argue that prime matter is in fact real, but also entirely nonactual. In effect, this is to claim that, for Aristotle, 'to be real' does not always mean 'to be actual', in the sense of being something determinate; stated differently, 'actuality' cannot be understood simply as a modal term, meaning the real, as opposed to the merely possible, but has, at least in this context, a narrower, more specific meaning. Nevertheless, if prime matter is something real, it should be possible to give some account of what this reality consists of. Frequently, this is done in terms of the roles that prime matter is supposed to perform. Such an answer, however, is unhelpful. It is both an analytic truth and an empty tautology to say that the nature of whatever acts as prime matter is to serve as the ultimate substratum of substantial change because 'prime matter' has already been defined as that which serves as this ultimate substratum. We already know what role prime matter is supposed to perform; we do not yet know, however, what kind of thing performs this role.[20]

From these texts we see that, according to Byrne, whatever is "nothing apart from some formal cause" cannot be the material principle in substantial change. But first matter (i.e., pure passive ability) is "nothing apart from some formal cause." Hence, first matter (i.e., pure passive ability) cannot be the material principle in substantial change. Further, Byrne adds that some defenders of the traditional doctrine try to escape the conclusion of this argument by denying that first matter is "nothing apart from some formal cause." Instead, they maintain that first matter is something real even though it has no actuality which is native to it. According to Byrne, however, to maintain this is nonsensical. For, if first matter is something real, we should be able to give a definition which makes known to us what its nature consists in. But every attempt to do just this, says Byrne, results in some tautology or other, such as, "first matter is the material principle in substantial change."

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[20] *Ibid.*, pp. 204-205.

Thus, Byrne concludes that, since we are unable to give a definition of first matter which makes known to us what it nature consists in, first matter (as the traditional doctrine understands it) is, in truth, "nothing apart from some formal cause."

The second part of Byrnes threefold objection maintains that pure passive ability is unable to be what underlies the essential and accidental properties of substances. Speaking to this, Byrne writes:

> ...the defenders of the traditional view argue that prime matter is the subject which underlies all of the essential and accidental properties of the sublunary elements. All of these properties can be separated from prime matter, at least in thought, because prime matter is defined by none of them or their negations; in this sense, they are all accidental to prime matter. Thus, whatever acts as prime matter is said to lack any intrinsic characteristic which would make it to be a "particular something" (*tode ti*), to which the terms predicable in the category of substance refer; it also lacks all of the properties referred to by the terms predicable in the other nine categories. Since these ten categories include all of the properties or characteristics that there are, prime matter, it is argued, must be thought of as purely potential, that is, completely characterless and indeterminate, possessing no discernible nature of its own.
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> Once again, however, this view that prime matter is pure potentiality runs into certain obstacles. If prime matter has no determinate reality of its own, then the material elements can no longer be thought of as composite substances; they are really just formal causes instantiated at certain locations in space....
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> ...[I]f prime matter is held to be purely potential, then the material elements, and possibly all perceptible substances, are what they are simply because of their formal causes. Not only does this contradict Aristotle's claim that perceptible substances are composites because they consist of both a formal and material cause, but it is also hard to see how prime matter can be this ultimate subject and yet be nothing by itself. The formal causes of perceptible substances exist only to the extent that they are found in a material cause, but if prime matter is nothing until it is informed by such a formal cause, this relation becomes viciously circular.[21]

This part of Byrne's objection seems to come to this: whatever is "nothing by itself" neither can enter into composition with substantial form nor can be that which underlies all the essential and accidental properties within a substance. But first matter (i.e., pure passive ability) is "nothing by

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[21] *Ibid.*, pp. 210-212.

itself." Therefore, first matter (i.e., pure passive ability) neither can enter into composition with substantial form nor can be that which underlies all essential and accidental properties within a substance. As a result of this, says Byrne, the traditional doctrine regarding first matter reduces to the position that natural substances are nothing other than substantial forms "instantiated at certain locations in space."

The third and final part of Byrne's threefold objection against the traditional doctrine of first matter holds that pure passive ability is unable to individuate numerically distinct substances. Concerning this, Byrne maintains the following:

> Because the formal cause can be found in several individuals at once, it cannot individuate itself; something else is required to determine a substance to exist as an individual at a particular time and place. According to the traditional doctrine, this role must ultimately belong to prime matter because every other material substratum short of prime matter is a composite entity, and thus further analyzable into formal and material causes. A purely potential prime matter, however, cannot do this because it brings literally nothing of its own to the formal cause it is supposed to individuate. As the individuating substratum of perceptible substances, prime matter is said to be really distinct from its formal cause, but if prime matter is nothing real, it is hard to see how it can be really distinct from its formal cause.[22]

The essence of Byrne's argument here is the following: whatever is pure passive ability cannot be the principle of individuation of many substances of the same kind. But first matter is pure passive ability. Hence, first matter cannot be the principle of individuation of many substances of the same kind. Byrne supports the major premise by stating that pure passive ability cannot be the principle of individuation "because it brings literally nothing of its own to the formal cause it is supposed to individuate." Clearly, Byrne holds this since he maintains that first matter (i.e., pure passive ability) is "nothing real."

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[22] *Ibid.*, pp. 216-217.

## 4. Reply to Byrne's First Objection

In reply to the first part of Byrne's argument, it must be said that Byrne's minor premise is false. In other words, it is false to maintain that first matter (i.e., pure passive ability) is "nothing apart from some formal cause." For, we know, *contra* Byrne, that the ability to be an actually existing substance is indeed something real, as defenders of the traditional doctrine such as Fr. Joseph Owens maintain.[23] We examined, in chapter six, how it is that we come to see both that there is a (real) material principle in substantial becoming and that this (real) material principle is pure passive ability. Nevertheless, it is fitting for us to manifest something of this doctrine again and to develop it to a certain extent.

We can manifest it by attending to our ability to know something such as Euclid's demonstration that the three interior angles of a triangle are equal to two right angles (i.e., proposition I.32). Everyone sees that in order to come to know proposition I.32, we must first be able to know it. Further, everyone grants that once we have come to know this proposition and, therefore, can be said to be knowers of this proposition, we still have the ability to know it. For, otherwise, we would have to maintain that we do in fact know proposition I.32, but lack the ability to know it (and, thus, are unable to know it), which is a contradiction. Hence, from this we see that

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[23] See, for example, the following text from Fr. Owens: "The original referent upon which the Aristotelian concept of matter is based is therefore the subject of accidental change, like wood or bronze. From the notion of 'subject', however, all determinations are removed, with the proviso that the negations as well as the determinations are accidental to it. In its own nature, then, this refined notion of subject remains as positive as ever. It was a positive notion from the start, as seen in a positive subject like wood or bronze, and all determinations were denied it under the express condition that none of these pertained to its own nature. In this way the positive notion is shown to be independent of determination. For Aristotle, 'actual' was a synonym for 'determinate'. What lacked actuality, or in technical language the potential, could therefore be positive. By establishing the concept of the potential as positive even though non-actual or indeterminate, Aristotle has been able to set up matter as a positive though entirely non-actual subject of predication. Because the potential is positive without being determinate, this concept of matter is possible to the human mind. Its referent is any sensible thing considered potentially as substance. It is the concept of a principle wholly undetermined, yet necessarily posited in reality by any form that is extended, multiplied in singulars, or terminating substantial change." "Matter and Predication in Aristotle," p. 46.

a positive and real passive ability on the part of the understanding is necessary, if we are either to come to know or to know something such as proposition I.32.

Now, by analogy, the same holds true in the order of substantial becoming. That is, if a substance is to come to be, there must first be something which is able to have the substantial form of that substance. Further, once the substance in question has come to be and, therefore, is, the something which was able to have the substantial form of that substance must still be able to be have that substantial form. For, otherwise, we would have to maintain that this something both has the substantial form of the given substance and lacks the ability to have the substantial form of the substance in question (and, hence, is unable to have the substantial form of the substance in question), which is absurd. Hence, from this we see that a positive and real passive ability for substantial form on the part of first matter is required, if a substance is either to come to be or to be. Indeed, this is the *aliquid positive* which St. Thomas speaks of in his *In Phys.*[24]

In addition to this, we can develop the doctrine explicated in chapter six, regarding the universal causality of first matter, by elucidating the fact that the nature of matter belongs more fully to the principle called "first matter" than it does to any other matter. In order to do this, let us revisit a text from St. Thomas on the universal causality of first matter. He writes:

> ...*hyle*, or first matter, is the most proper subject receptive of generation and

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[24] See *In Phys.*, Bk. 1, *lectio* 13, vol. 2, p. 45. There St. Thomas says: "Et dicit quod licet subiectum sit unum numero, tamen specie et ratione est duo, ut supra dictum est; quia homo et aurum et omnis materia numerum quendam habet. Est enim ibi considerare ipsum subiectum, quod est aliquid positive, ex quo fit aliquid per se et non per accidens, ut hoc quod est homo et aurum; et est ibi considerare id quod accidit ei, scilicet contrarietatem et privationem, ut immusicum et infiguratum. Tertium autem est species vel forma, sicut ordinatio est forma domus, vel musica hominis musici, vel aliquod aliorum quae hoc modo praedicantur. Sic igitur forma et subiectum sunt principia per se eius quod fit secundum naturam; sed privatio vel contrarium est principium per accidens, inquantum accidit subiecto; sicut dicimus quod aedificator est causa activa domus per se, sed musicum est causa activa domus per accidens, inquantum accidit aedificatori esse musicum. Et sic homo est causa per se, ut subiectum, hominis musici; sed non musicum est causa et principium eius per accidens."

> corruption. For...it immediately stands under substantial forms which, through generation and corruption, come and go. But in some way, namely from the consequent and mediately, it underlies all other changes. For all subjects of other changes are receptive of other contrarieties which are reduced to the first contrariety, that of form and privation, whose subject is first matter, as is said in Book One of the Physics. Thus, all other subjects participate in some way in first matter insofar as they are composed of matter and form.[25]

From this text we see that every matter other than first matter bears the notion of matter through or on account of first matter. For example, Mr Smith, this horse, and this oak tree can be conceived of as matters through or on account of the first matter which is within them. But *propter quod unumquodque tale et illud magis est.* Hence, we must say that first matter bears the notion of matter more so than does Mr. Smith, this horse, this oak tree, or any other matter. Or, to put this another way, the nature of matter belongs more fully to first matter than it does to anything else.[26]

Nonetheless, it does not follow from this that first matter is more real than the things which are principled by it, such as Mr. Smith, this horse, and this oak tree. For, although first matter has the nature of matter more fully than anything else, since it *is* passive ability while every other matter only *has* passive ability, we say that one thing is more real than another insofar as it is more actual. It does follow, however, that the reality of passive ability is indeed found more fully or more

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[25] *...hyle*, sive materia prima, est maxime proprium subiectum susceptibile generationis et corruptionis: quia, sicut dictum est, immediate substat formis substantialibus, quae per generationem et corruptionem adveniunt et recedunt. Sed quodammodo, scilicet ex consequenti et mediate, subiicitur omnibus aliis transmutationibus: quia omnia subiecta aliarum transmutationum sunt susceptibilia aliquarum contrarietatum, quae reducuntur in primam contrarietatem, quae est formae et privationis, cuius subiectum est prima materia, ut dicitur in I Physic. Et ideo omnia alia subiecta participant quodammodo materiam primam, inquantum ex materia et forma componuntur. Ultimo autem epilogando concludit, quod determinatum sit hoc modo de generatione simpliciter, utrum sit vel non sit; et si est, quomodo est; et similiter etiam de alteratione. *In de Gen.*, Bk. 1, *lectio* 10, vol. 3, p. 301.

[26] See also the related discussion that St. Thomas has in *In de Causis*, *lectio* 1, p. 8. He says, "In causis autem materialibus similis ratio invenitur; nam id quod primo substernitur ut materia, causa est propinquioris materiae ut et ipsa materialiter substet, sicut materia prima elementis, quae sunt quodammodo materia mixtorum corporum."

completely in first matter than in anything else. Thus, we can say, *contra* Byrne, that the ability to be a substance or to have substantial form is indeed something real and that this kind of ability is found more fully or more completely in first matter than in anything else.

Commenting on the error in the first part of Byrne's objection, it seems that Byrne has not advanced far beyond the Pre-Socratics in his understanding of the nature of first matter.[27] For he seems to think that first matter must be either an actually existing substance or non-substance. Byrne fails to see, however, that between these two candidates for the nature of first matter, there lies, or underlies, a third candidate, to wit, the ability to be an actually existing substance.

Perhaps another, and more flattering way, to describe Byrne's error is to hold that he, like Plato, has insufficiently delineated the nature of first matter from the lack of substantial form. Regarding this error, Aristotle writes:

> Others [i.e., Plato and his followers], too, touched upon this [nature], then, but not sufficiently. For, first, they agree, insofar as [they think that] Parmenides speaks rightly, that for something to come to be simply is [to come to be] from non-being. Further, it appeared to them that if a thing is one in number, it is also only one in potency [i.e., in power].
>
> But this is very different. For we say that material and privation are different, and that of those, one, the material, is non-being accidentally, but privation is non-being in virtue of itself, and that the one, the material, is close to and somehow is substance, but the other [is substance] in no way.[28]

Commenting on this text, St. Thomas writes:

> He [i.e., Aristotle] says first that certain philosophers touched upon matter, but not sufficiently, for they did not distinguish between privation and matter. Hence, they attributed to matter what belongs to privation. And since privation, according to

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[27] As was mentioned above, concerning the notion of "Perennial Presocratism," see, Fr. Lawrence Dewan, O.P., "St. Thomas and the Hylomorphic Ontology," pp. 4-9 and *Form and Being: Studies in Thomistic Metaphysics*, pp. 97-109.

[28] *Physics*, Bk. 1, ch. 9, 192a4-8.

itself, is non-being, they said that matter, according to itself, is non-being. And, thus, just as something comes to be simply and *per se* from matter, they maintained that something comes to be simply and *per se* from non-being.

And they were led to maintain this for two reasons. First, from the saying of Parmenides that whatever is other than being is non-being. Whence, since matter is other than being, since it is not being in act, they said that it is non-being simply speaking. Second, since it seemed to them that what is one in number or subject is one in account. Here it is said to be one in potency since those things that are one in account have the same power. But those things which are one in subject, but not in account do not have the same potency or power, as is clear in the case of white and musical. But subject and privation are one in number, as in the case of the bronze and the unshaped. Hence, it seemed to them that they were the same in account or power. Therefore, here he takes there to be a unity of power.

...[In reply to this] Aristotle says that there is a great difference between something being one in number or subject and something being one in power or account. We ourselves say...that although matter and privation are one in subject, nevertheless, they are different in account. This is clear from two things. First, because matter is non-being accidentally, while privation is non-being *per se*. For what is "unshaped" signifies non-being, but "bronze" does not signify non-being except insofar as unshaped happens to it. Second, because matter is almost a thing [i.e., substance], and is so in some way, since it is in potency to being a thing [i.e., substance], and is in some way the substance of a thing, since it enters into the constitution of substance. But this cannot be said of privation.[29]

If it was unclear in chapter six, it is now evident that first matter and the lack of substantial form are

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[29] Dicit ergo primo quod quidam philosophi tetigerunt materiam, sed non sufficienter; quia non distinguebant inter privationem et materiam: unde quod est privationis, attribuebant materiae. Et quia privatio secundum se est non ens, dicebant quod materia secundum se est non ens. Et sic, sicut aliquid simpliciter et per se fit ex materia, sic confitebantur quod simpliciter et per se aliquid fit ex non ente. Et ad hoc ponendum duabus rationibus inducebantur. Primo quidem ratione Parmenidis dicentis quod quidquid est praeter ens est non ens: unde cum materia sit praeter ens, quia non est ens actu, dicebant eam simpliciter esse non ens. Secundo vero quia videbatur eis quod id quod est numero unum vel subiecto, sit etiam ratione unum: quod hic appellat esse *potentia* unum, quia ea quae sunt ratione unum, sic se habent quod eadem est virtus utriusque; ea vero quae sunt subiecto unum sed non ratione, non habent eandem potentiam seu virtutem, ut patet in albo et musico. Subiectum autem et privatio sunt unum numero, ut aes et infiguratum: unde videbatur eis quod essent idem ratione vel virtute. Sic igitur hic accipit unitatem potentiae.

Dicit...quod multum differt aliquid esse unum numero vel subiecto, et esse unum potentia vel ratione. Quia nos ipsi dicimus, ut ex superioribus patet, quod materia et privatio, licet sint unum subiecto, tamen sunt alterum ratione. Quod patet ex duobus. Primo quidem quia materia est non ens secundum accidens, sed privatio est non ens per se: hoc enim ipsum quod est infiguratum, significat non esse, sed aes non significat non esse, nisi inquantum ei accidit infiguratum. Secundo vero quia materia est *prope rem*, et est aliqualiter, quia est in potentia ad rem, et est aliqualiter substantia rei, quia intrat in constitutionem substantiae: sed hoc de privatione dici non potest. *In Phys.*, Bk. 1, *lectio* 15, vol. 2, p. 52.

different in account, though they are one in subject. It may well be due to a failure to make this distinction that Byrne maintains that first matter is "nothing apart from some formal cause."

A final thing which may have led Byrne astray is the fact that first matter cannot be without substantial form. In other words, Byrne may have seen that first matter cannot exist without some substantial form and, from this, concluded that first matter must be "nothing apart from some formal cause." Such reasoning, however, proves too much. For, by this argument, every substantial form, save that of man, would be "nothing apart from some material cause." For, as we saw in chapter six, just as matter does not have existence in act except through form, so form is not (again, with the exception of the substantial form of man) except insofar as it is in its proper matter. Thus, even the fact that first matter cannot be without some substantial form is insufficient evidence for one to conclude that first matter must be "nothing apart from some formal cause."

### 5. Reply to Byrne's Second Objection

Regarding the second part of Byrne's objection, it is already manifest, from the reply to the first part of his objection, that the minor premise of Byrne's syllogism is false. That is, it has been shown that it is false to maintain that first matter (i.e., pure passive ability) is "nothing by itself." Now, from this alone, it is clear that the second part of Byrne's objection fails. Yet, in addition to this, it seems that Byrne's major premise contains a serious misunderstanding of the traditional doctrine regarding first matter. For this premise asserts that, according to the traditional doctrine, first matter "underlies all the essential and accidental properties within a substance." The traditional doctrine regarding first matter, however, definitely does not affirm this. On the contrary, this doctrine maintains that it is substance itself which underlies all the essential and accidental properties

which belong to it.

In order to provide an explication of why the traditional doctrine maintains this, let us examine the following text from the Angelic Doctor's *De ente*:

> But because that which is said maximally and most truly in any genus is the cause of those things that are afterwards in that genus, as fire, which is the utmost of hotness, is the cause of heat in hot things, as is said in Book Two of the *Metaphysics*, thus, substance, which is first in the genus of being, having essence most truly and maximally, must be the cause of accidents, which share in the nature of being secondarily and, as it were, in a certain respect. But this happens in many ways. For since the parts of substance are matter and form, some accidents principally follow from form and some principally follow from matter. Now some form does not depend on matter for its existence, as in the case of the intellectual soul. Matter, however, does not have existence except through form. Hence, in accidents which follow from form, there is something which does not have any sharing in matter, as in the case of understanding, which is not through a bodily organ, as the Philosopher proves in Book Three of *On the Soul*. Some accidents which follow from form, however, have a sharing in matter, as in the case of sensation. But no accident which follows from matter is without some sharing in form. Nevertheless, a certain diversity is found amongst those accidents which follow from matter. For some accidents follow from matter according to an order which matter has to a specific form, as in the case of the masculine and the feminine in animals, the diversity of which is reduced to matter, as is said in Book Ten of the *Metaphysics*. Whence, when the form of an animal is removed, the said accidents remain only equivocally. But some accidents follow from matter according to an order which matter has to a general form. Thus, when a specific form is removed, these accidents remain in the matter besides, as the blackness of the skin of the Ethiopian is from the mixture of the elements and not from the nature of the soul; and, so, after death it remains in them. And because each thing is individuated by its matter and placed in a genus or species through its form, thus, accidents which follow from matter are accidents of the individual, according to which individuals of the same species differ from each other. Accidents, however, which follow from form are the proper passions of the genus or species. Hence, these accidents are found in all things sharing the nature of the genus or species, as being risible follows from the form in man since laughing occurs from some apprehension of the human soul.[30]

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[30] Sed quia illud, quod dicitur maxime et verissime in quolibet genere, est causa eorum quae sunt post in illo genere, sicut ignis qui est in fine caliditatis est causa caloris in rebus calidis, ut in II metaphysicae dicitur, ideo substantia quae est primum in genere entis, verissime et maxime essentiam habens, oportet quod sit causa accidentium, quae secundario et quasi secundum quid rationem entis participant. Quod tamen diversimode contingit. Quia enim partes substantiae sunt materia et forma, ideo quaedam accidentia principaliter consequuntur formam et quaedam materiam. Forma autem invenitur aliqua, cuius esse non dependet ad materiam, ut anima intellectualis;

At the very outset of this text we see St. Thomas prove that substance is the cause of the accidents which belong to it. For what is maximally and most truly in any genus is the cause of those things that are afterwards in that genus. But substance is what is maximally and most truly in the genus of being (i.e., it is first in the genus of being). Hence, substance "must be the cause of accidents, which share in the nature of being secondarily and, as it were, in a certain respect." Now, at the end of this text, we find St. Thomas distinguish between those accidents which belong to every individual of a given species or genus and those accidents by which individuals of a given species differ from each other. Although it is certainly true that substance is the cause of the accidents which are in it, St. Thomas specifies this truth by noting that those accidents which are common to every individual of a species or genus are accidents which follow principally from substantial form, while those accidents by which individuals of a given species differ from each other are accidents which follow principally from their respective matters.[31] Thus, risibility, which is an accident belonging to every

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materia vero non habet esse nisi per formam. Unde in accidentibus, quae consequuntur formam, est aliquid, quod non habet communicationem cum materia, sicut est intelligere, quod non est per organum corporale, sicut probat philosophus in III de anima. Aliqua vero ex consequentibus formam sunt, quae habent communicationem cum materia, sicut sentire. Sed nullum accidens consequitur materiam sine communicatione formae. In his tamen accidentibus, quae materiam consequuntur, invenitur quaedam diversitas. Quaedam enim accidentia consequuntur materiam secundum ordinem, quem habet ad formam specialem, sicut masculinum et femininum in animalibus, quorum diversitas ad materiam reducitur, ut dicitur in X metaphysicae. Unde remota forma animalis dicta accidentia non remanent nisi aequivoce. Quaedam vero consequuntur materiam secundum ordinem, quem habet ad formam generalem, et ideo remota forma speciali adhuc in ea remanent, sicut nigredo cutis est in Aethiope ex mixtione elementorum et non ex ratione animae, et ideo post mortem in eis remanet. Et quia unaquaeque res individuatur ex materia et collocatur in genere vel specie per suam formam, ideo accidentia, quae consequuntur materiam, sunt accidentia individui, secundum quae etiam individua eiusdem speciei ad invicem differunt, accidentia vero, quae consequuntur formam, sunt propriae passiones vel generis vel speciei; unde inveniuntur in omnibus participantibus naturam generis vel speciei, sicut risibile consequitur in homine formam, quia risus contingit ex aliqua apprehensione animae hominis. *De ente*, ch. 6, vol. 43, p. 380.

[31] Cajetan's explanation of the meaning here of the adverb "principally" is helpful. He writes: "Apposuit...in prima divisione ly principaliter, ut distinguitur contra totaliter: nullum enim accidens est solius formae aut solius materiae, sed omnia sunt compositi (etenim ad ipsam quoque intellectionem non solum anima concurrit sed totum compositum ex materia et forma, Sortes enim est, qui primo intelligit). Est ergo sensus divisionis quod accidentium quaedam sequuntur formam non ut causam totalem sed principalem: quaedam similiter sequuntur materiam ut causam principalem non totalem. Cum enim omnium accidentium causa sit id quod vere est, id est

man, follows principally from the substantial form of man, whereas the accidents of masculinity and femininity arise principally from the matters of the individuals to which these accidents belong.

Now the reason why the latter accidents follow principally from matter while the former follow principally from substantial form is "because each thing is individuated by its matter and placed in a genus or species through its form." Explaining this reason more fully, Cajetan writes:

> The proximate root of the difference [i.e., between the two kinds of accidents] is also assigned when it says that matter is the principle of individuation, but form is that through which a thing is placed in its genus or species. For from the fact that matter is the cause of individual existence as such, it follows that it is also the root of the accidents following from individual existence itself; and through this, accidents of the individual are those which follow from matter. Now since form is the principle of generic and specific existence, it is necessary that it also be the cause of the properties and accidents following from the species and genus. And, thus, the accidents of the species or genus follow from form.[32]

The essence of Cajetan's argument seems to be this: whatever follows from individual existence as such follows principally from the root of individual existence as such. But accidents of the individual follow from individual existence as such. Thus, accidents of the individual follow principally from the root of individual existence as such. Now the root of individual existence as

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substantia completa, omnium causa est compositum ex materia et forma: sed aliquorum principalis radix est forma, aliquorum vero principalis radix est materia. Sicut enim in artificialibus aliquid convenit composito ratione formae et aliquid ratione materiae, quemadmodum scindere convenit serrae ratione formae, durities autem ratione materiae: ita et in naturalibus aliquid oritur in composito ratione formae, et aliquid ratione materiae quemadmodum in Sorte sentire et intelligere est ratione formae, masculinum vero ratione materiae." *Commentaria in De Ente et Essentia,* ch. 6

[32] Assignatur quoque radix proximae differentiae, cum dicitur, quod materia est principium individuationis, forma autem est, per quam res in genere vel specie collocatur. Ex hoc enim, quod materia est causa esse individualis ut sic, sequitur quod sit etiam radix accidentium consequentium ipsum esse individuale; ac per hoc accidentia individui sunt quae consequuntur materiam; ex eo quod forma est principium esse generici et specifici oportet quod etiam sit causa proprietatum et accidentium consequentium speciem vel genus: et sic accidentia speciei sive generis sequuntur formam. *Commentaria in De Ente et Essentia,* ch. 6. In the next line Cajetan continues: "quia cum tam in forma specifica quam generica conveniant omnia contenta sub eis, oportet etiam proprietates earum omnibus esse communes. Cum autem penes materiam differant individua, accidentia quoque materialia oportet esse ea, secundum quae ipsa particularia inter se differunt, ut effectus proportionabiliter propriis respondeant causis."

such is matter (as we shall see below). Hence, accidents of the individual follow principally from matter. Likewise, whatever follows from generic and specific existence as such follows principally from the principle of generic and specific existence as such. But accidents of the genus and of the species follow from generic and specific existence as such. Hence, accidents of the genus and of the species follow principally from the principle of generic and specific existence as such. Now the principle of generic and specific existence as such is substantial form. Hence, accidents of the genus and of the species follow principally from substantial form.

In addition to these things, St. Thomas also subdivides those accidents which follow principally from substantial form as well as those which follow principally from matter. Those accidents which follow principally from substantial form are subdivided into those which have no sharing in matter (e.g., the understanding) and those which have some sharing in matter (e.g., the senses). That the understanding is an accident which has no sharing in matter is made clear from the fact that the understanding does not depend on a bodily organ for the exercise of its proper operation. The senses, on the other hand, are accidents which have some sharing in matter since they do depend on certain bodily organs for the exercise of their respective proper operations.

In a similar way, those accidents which follow principally from matter are subdivided into those which follow from matter according to an order that it has to a specific form and those which follow from matter according to an order that it has to a general form. The example that St. Thomas gives of the former is masculinity and femininity in animals. A sign that these accidents follow from the order which matter has to the substantial form of an animal, as opposed to some more general form, is that when the said animal dies, its corpse is not said to be masculine or feminine except equivocally. Thus, a corpse is as masculine or feminine as is a statue of a male or female animal.

On the other hand, those accidents which follow from matter according to an order that it has to a general form are exemplified by the blackness in the Ethiopian's skin. The sign which St. Thomas gives that the Ethiopian's blackness follows from the order which matter has to a general form is that both the Ethiopian and his corpse are said to be black with one and the same meaning in mind (i.e., they are said to be black univocally and not equivocally).

From these considerations, then, it is clear that, *contra* Byrne's understanding, the traditional doctrine regarding first matter holds that substance itself underlies all the essential and accidental properties which belong to it.[33] In addition to this, we have manifested the fact that, while substantial form is the principle from which all of the essential properties (i.e., accidents which are proper to a given genus or species) of a natural substance principally follow, matter is the principle from which all of the accidental properties (i.e., accidents which belong to individual substances as such) of a natural substance principally follow. As a result, it is plain that the second part of Byrne's objection fails since both of its premises are false.

## 6. Reply to Byrne's Third Objection

Turning now to our reply to the third and final part of Byrne's threefold objection, it is clear that Byrne's minor premise is true. That is, it is true that first matter is pure passive ability. Thus, the question before us is this: In what way can pure passive ability be the principle of individuation

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[33] In saying this we are not denying the truth of the following statement by John of St. Thomas: "In sententia D. Thomae, quod materia est pura potentia, nullo modo potest ipsa materia, etiam supposita forma ut conditione tantum, esse per se sola subiectum inhaesionis accidentium materialium, sed ipsum compositum est subiectum inhaesionis. Materia autem solum est receptiva accidentium tamquam subiecto quo, quatenus est id, quo compositum recipit accidentia post receptam formam substantialem in materia." *Cursus Philosophicus, Phil. Nat.*, p. 3, q. 9, a. 1, p. 755. Here John of St. Thomas is noting that while accidents are in substance alone as in a *subiectum quod*, they can be said to be in first matter as in a *subiectum quo* insofar as first matter is that by which the natural substance of which it is an essential part is enabled to underlie or receive accidents into itself.

of many substances of the same kind? We can begin to answer this query by turning to a text from St. Thomas's *In de Trin.* There St. Thomas says:

> ...those things which differ in number in the genus of substance do not differ only in their accidents, but even in their matter and form. But if it be asked why they have different forms, there is no other reason besides the fact that they have different designated matters. But the only reason why this matter is divided from the other is because of quantity. And, thus, matter subject to dimension is understood to be the principle of this diversity.[34]

This text is helpful insofar as it presents St. Thomas's position on this matter in summary form. We observe that individual substances of the same kind differ not only in their accidents, but also in their substantial forms and designated matters. But their substantial forms differ only because their designated matters differ. That is, this substantial form differs in number from that substantial form because this matter of this substantial form differs in number from that matter of that substantial form. Yet, this matter of this substantial form differs in number from that matter of that substantial form only through quantity. Hence, it is the case that matter subject to quantity is the principle of the diversity of substantial forms of the same kind and, therefore, of individual substances of the same kind.

Yet, this text also raises at least two significant questions. First, this text assumes that this matter is distinguished from that matter only through quantity. Why is this so? Second, this text seems to maintain that quantity can be in first matter before substantial form. How is this possible, especially given that, in chapter six, we showed that no accident can be in first matter before

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[34] ...illa, quae differunt numero in genere substantiae, non solum differunt accidentibus, sed etiam forma et materia. Sed si quaeratur, quare differens est eorum forma, non erit alia ratio, nisi quia est in alia materia signata. Nec invenitur alia ratio, quare haec materia sit divisa ab illa, nisi propter quantitatem. Et ideo materia subiecta dimensioni intelligitur esse principium huius diversitatis. *In de Trin.*, q. 4, a. 2 *ad* 4*um*, vol. 50, p. 126.

substantial form?

In order to answer these questions adequately, we must turn to St. Thomas's fuller consideration of this issue. In the body of the same article from his *In de Trin.*[35] he maintains the following:

> But in this way the diversity amongst individuals of one species must be considered. For according to the Philosopher, in Book Seven of the *Metaphysics*, just as matter and form are the parts of genus and species, so this matter and this form are the parts of the individual. Hence, just as the diversity of matter and form absolutely causes the diversity of genus or species, so [the diversity of] this form and this matter causes diversity in number. But no form insofar as it is such is this [form] in virtue of itself. Now I say "insofar as it is such," because of the rational soul which in a certain way is a "this something" in virtue of itself, but not insofar as it is a form. For the intellect is naturally able to attribute to many any form which is able to be received into something as into matter or as into a subject. But this is against its nature as a this something. Hence, form comes to be this [form] from the fact that it is received into matter. But since matter in itself is indistinct, it is impossible for it to individuate the received form except insofar as it is distinguishable. For form is not individuated by being received into matter except insofar as it is received into this distinct matter determined to here and now. But matter is only divisible through quantity. Whence the Philosopher says in Book One of the *Physics* that if quantity were subtracted, substance would be indivisible. And, thus, matter is made to be this [matter] and designated [matter] insofar as it is subject to dimensions.
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> But dimensions can be considered in two ways. In one way, according to their termination, and I say they are terminated according to a determinate size and figure, and thus as perfect beings placed in the genus of quantity. And these cannot be the principle of individuation. For since such a termination of dimensions frequently varies in an individual, it would follow that an individual would not always remain the same in number. In another way, [dimensions] can be considered without this determination, in the nature of dimensions alone. Nevertheless, they can never be without some determination, just as the nature of color [cannot be] without the determination of white or black. Thus, they are placed in the genus of quantity as something imperfect. And from these indeterminate dimensions, matter is made

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[35] For a treatment of how this text fits with the rest of St. Thomas's teachings on the individuation of natural substances, see, Joseph Bobik, "Dimensions in the Individuation of Bodily Substances," *Philosophical Studies* (St. Patrick's College, Maynooth, Ireland), vol. 4 (Dec., 1954), pp. 71-79 as well as, Fr. Joseph Owens, "Thomas Aquinas: Dimensive Quantity as Individuating Principle," *Mediaeval Studies* 50 (1988), pp. 279-310. For a brief survey with reference to the Thomistic discussion on the principle of individuation, see *St. Thomas Aquinas, Faith, Reason and Theology: Questions I-IV of his Commentary on the De Trinitate of Boethius*, trans. by Armand Maurer (Toronto: Pontifical Institute of Mediaeval Studies, 1987), xxix-xxxv.

to be this designated matter, and thus matter individuates form, and thus from matter is caused the diversity according to number in the same species.[36]

From this text, we can glean the answer to the first question raised above. In response to this question, we can state that first matter is in itself indistinct. This is clear from the fact that first matter as such is nothing other than pure passive ability. Indeed, we saw in chapter six that insofar as first matter is pure passive ability it can be said to be numerically one. As a result, first matter is distinguishable or divisible only insofar as it is subject to that which is divisible in virtue of itself.[37]

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[36] Inter individua vero unius speciei hoc modo consideranda est diversitas. Secundum philosophum enim in VII metaphysicae sicut partes generis et speciei sunt materia et forma, ita partes individui sunt haec materia et haec forma. Unde sicut diversitatem in genere vel specie facit diversitas materiae vel formae absolute, ita diversitatem in numero facit haec forma et haec materia. Nulla autem forma in quantum huiusmodi est haec ex se ipsa. Dico autem in quantum huiusmodi propter animam rationalem, quae quodammodo ex se ipsa est hoc aliquid, sed non in quantum forma. Intellectus enim quamlibet formam, quam possibile est recipi in aliquo sicut in materia vel in subiecto, natus est attribuere pluribus, quod est contra rationem eius quod est hoc aliquid. Unde forma fit haec per hoc quod recipitur in materia. Sed cum materia in se sit indistincta, non potest esse quod formam receptam individuet, nisi secundum quod est distinguibilis. Non enim forma individuatur per hoc quod recipitur in materia, nisi quatenus recipitur in hac materia distincta et determinata ad hic et nunc. Materia autem non est divisibilis nisi per quantitatem. Unde philosophus dicit in I physicorum quod subtracta quantitate remanebit substantia indivisibilis. Et ideo materia efficitur haec et signata, secundum quod subest dimensionibus.

Dimensiones autem istae possunt dupliciter considerari. Uno modo secundum earum terminationem; et dico eas terminari secundum determinatam mensuram et figuram, et sic ut entia perfecta collocantur in genere quantitatis. Et sic non possunt esse principium individuationis; quia cum talis terminatio dimensionum varietur frequenter circa individuum, sequeretur quod individuum non remaneret semper idem numero. Alio modo possunt considerari sine ista determinatione in natura dimensionis tantum, quamvis numquam sine aliqua determinatione esse possint, sicut nec natura coloris sine determinatione albi et nigri; et sic collocantur in genere quantitatis ut imperfectum. Et ex his dimensionibus indeterminatis materia efficitur haec materia signata, et sic individuat formam, et sic ex materia causatur diversitas secundum numerum in eadem specie. *In de Trin.*, q. 4, a. 2, vol. 50, pp. 124-125.

[37] Joseph Bobik writes: "Although it is a fact, easily verified through sense observation, that the matter of natural substances is divisible into parts, it is nonetheless, we must note, not of itself, or *per se*, so divisible. This is clear from the fact that of itself matter is simply potentiality for substantial form. In every case in which there is something which is such-and-such but not per se (which is to say, *per accidens*) there must be something other which is such-and-such *per se.* In this case this other is obviously the three-dimensional quantity which we see natural substances have, for dimensive quantity is of itself divisible. In a word, matter is divisible, but not because it is matter, for of itself matter is simply the potentiality for substantial form, hence of itself not the source of divisibility. Rather matter is divisible because it is three dimensionally quantified. It is a fact that matter is both quantified and divisible, but it is neither of itself." From his, *Aquinas on Being and Essence: A Translation and Interpretation* (Notre Dame, IN: University of Notre Dame Press, 1965), p. 77.

This is not to deny, of course, that first matter is in fact the *first* principle of the individuation of substantial forms. Regarding this, St. Thomas teaches that, "...primum individuationis principium est materia, qua acquiritur esse in actu cuilibet tali formae sive substantiali sive accidentali; et secundarium principium individuationis est

But it is only dimensive quantity which is divisible in virtue of itself.[38] Hence, first matter is distinguishable or divisible only insofar as it is subject to dimensive quantity.

Furthermore, we see from this text what sort of dimensions are required in order for matter to be able to individuate substantial forms. St. Thomas tells us that dimensions can be considered in two ways, namely, as terminated or as unterminated. Terminated dimensions (i.e., a certain definite size and shape), however, are unable to explain the divisibility of matter. For, as St. Thomas notes, these dimensions frequently vary throughout the life of a given natural substance while the natural substance in question remains one in number. For example, even though Mr. Smith may gain or lose fifty pounds, and in the process undergo a certain change of shape, nevertheless, he is still Mr. Smith and is still numerically distinct from Mrs. Smith and the little Smiths.

Moreover, such terminated dimensions are not presupposed by, but rather presuppose an already individuated natural substance.[39] For example, what makes Mr. Smith's size and shape to be numerically distinct from Mrs. Smith's size and shape is that fact that Mr. Smith's size and shape inhere in him while Mrs. Smith's size and shape inhere in her. From these considerations, then, it is evident that divisibility does not belong to matter because it is subject to terminated dimensions.

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dimensio, quia ex ipsa habet materia quod dividatur." *In Sent.*, Bk. 4, d. 12, q. 1, a. 1, qc. 3 *ad* 3*um*, vol. 4, p. 503.

[38] See, for example, *SCG*, Bk. 4, ch. 65, vol. 15, p. 209: "...sola quantitas dimensiva de sui ratione habet unde multiplicatio individuorum in eadem specie possit accidere, prima radix huiusmodi multiplicationis ex dimensione esse videtur: quia et in genere substantiae multiplicatio fit secundum divisione materiae; quae nec intelligi posset nisi secundum quod materia sub dimensionibus consideratur: nam, remota quantitate, substantia omnis indivisibilis est, ut patet per Philosophum in I Physicorum." See also, *Quod.*, VII, q. 4, a. 3, vol. 25, 1, pp. 22-24.

[39] The following text elucidates this point: "Et ideo recte materie convenit individuare omnes alias formas, ex hoc quod subditur illi forme que ex se ipsa habet individuationis rationem, ita quod etiam ipse dimensiones terminate, que fundantur in subiecto iam completo individuantur quodammodo ex materia individuata per dimensiones interminatas preintellectas in materia." *In de Trin.*, q. 4, a. 2 *ad* 3*um*, vol. 50, p. 126.

As a result, we must maintain that it is insofar as matter is understood to be subject to dimensions considered as unterminated (i.e., unterminated size and shape) that it is divisible and, consequently, capable of individuating substantial forms of natural substances.[40] In other words, the commensurately universal cause of matter's divisibility and capability of individuating substantial forms must be nothing other than matter considered as subject to unterminated dimensions. For we have seen, on the one hand, that first matter considered as such, is altogether indistinct and indivisible (and, hence, this cause is more universal than the effect in question) and, on the other hand, that matter considered as subject to terminated dimensions already presupposes the divisibility of matter (and, hence, this cause is more particular than the effect in question). As a result, that cause which is both less universal than first matter considered as such and more universal than matter considered as subject to terminated dimensions, namely, matter considered as subject to unterminated dimensions must be the proper cause of matter's divisibility and capability of individuating substantial forms.

Having answered the first of the two questions raised above, we should now turn to a consideration of the second question. Hence, we must address whether St. Thomas's understanding of the principle of individuation affirms that it is possible for the accident of quantity to be in first matter before substantial form.[41] In order to address this question, let us consider the following two

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[40] Bobik notes well that, "It is maximally important to recognize the fact that unterminated dimensions are *in reality* one with the natural and terminated dimensions of the bodily individual. The bodily individual does not possess two essentially distinct sets of dimensions. *Considered* as unterminated, the dimensions of the bodily individual are taken precisely in their distinctive quantitative nature, excluding every completion or termination." From, "St. Thomas on the Individuation of Bodily Substances," in *Readings in the Philosophy of Nature*, p. 338.

[41] The following text from the *In Sent.* also seems to raise this same question: ...Commentator dicit... in materia generabilium et corruptibilium oportet intelligere dimensiones interminatas ante adventum formae substantialis; alias non posset intelligi divisio materiae, ut in diversis partibus materiae diversae formae substantiales essent. Hujusmodi autem dimensiones post adventum formae substantialis accipiunt esse terminatum et completum.

objections and the replies that St. Thomas makes to them from the *Prima pars*. St. Thomas writes:

> Every form is in matter which is proper and disposed to itself. But the dispositions to form are certain accidents. Thus, some accidents must be pre-understood in matter prior to substantial form and, thus, prior to the soul since the soul is a certain substantial form.[42]

And:

> ...diverse forms of one species require diverse parts of matter. But the parts of matter cannot be understood as diverse except according to the division of dimensive quantity. Thus, it is necessary to understand dimensions in matter prior to the many substantial forms of one species.[43]

In response to the first objection, St. Thomas states:

> ...it must be said that a more perfect form contains by its power whatever belongs to lower forms. And, thus, one and the same [form] existing [in matter] perfects the matter according to diverse levels of perfection. For it is through the essence of one and the same form that a man is a being in act, a body, a living thing, an animal, and a man. But it is manifest that proper accidents follow upon each genus. Therefore, just as matter is pre-understood as perfect according to existence before it is understood as bodily, and thus concerning the others, so too the accidents which are proper to being are pre-understood before corporeity. And thus dispositions are pre-understood in matter before form, not as regards every effect of form, but regarding

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Quidquid autem intelligitur in materia ante adventum formae substantialis, hoc manet idem numero in generato et in eo ex quo generat; quia remoto posteriori oportet remanere prius; dimensiones autem illae interminatae se habent ad genus quantitatis sicut materia ad genus substantiae. Unde sicut in quolibet completo in genere substantiae est accipere materiam, quae est ens incompletum in genere illo; ita in dimensionibus completis...est accipere dimensiones incompletas... Bk. 4, d. 12, q. 1, a. 2, qc. 4, vol. 4, pp. 513-514.

[42] Omnis enim forma est in materia sibi propria et disposita. Sed dispositiones ad formam sunt accidentia quaedam. Ergo oportet praeintelligi accidentia aliqua in materia ante formam substantialem, et ita ante animam, cum anima sit quaedam substantialis forma. *ST* I, q. 76, a. 6, 1*um*, vol. 5, p. 229.

[43] ...diversae formae unius speciei requirunt diversas materiae partes. Partes autem materiae diversae non possunt intelligi nisi secundum divisionem dimensivarum quantitatum. Ergo oportet intelligere dimensiones in materia ante formas substantiales, quae sunt multae unius speciei. *ST* I, q. 76, a. 6, 2*um*, vol. 5, p. 229.

those that are posterior.[44]

And in answer to the second objection, St. Thomas says:

> ...it must be said that quantitative dimensions are accidents following from corporeity which belongs to the whole of matter. Whence matter already understood under corporeity and dimensions can be understood as distinct in diverse parts so that it receives diverse forms according to the higher levels of perfection. For although it is the same form which, according to its essence, gives diverse levels of perfection to matter, nevertheless, it differs according to the consideration of reason.[45]

Given these texts, it is possible to respond to the second question raised above. St. Thomas makes it clear in these texts that one and the same substantial form gives to first matter all of the different levels of perfection which it receives. In addition, substantial form gives these levels of perfection to first matter both in the same instant and in a certain order. Thus, even though first matter receives the perfection of existence in the same instant that it receives the perfection of bodily existence and so on for the other levels of perfection, nonetheless, the lower levels of perfection must be understood to be in first matter before we can understand the higher levels of perfection to be in it.

Furthermore, not only must the lower levels of perfection be pre-understood in first matter before we can understand the higher levels of perfection to be in first matter, but also the proper accidents which necessarily follow from the lower levels of perfection must be pre-understood as

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[44] ...dicendum quod, sicut ex praedictis patet, forma perfectior virtute continet quidquid est inferiorum formarum. Et ideo una et eadem existens, perficit materiam secundum diversos perfectionis gradus. Una enim et eadem forma est per essentiam, per quam homo est ens actu, et per quam est corpus, et per quam est vivum, et per quam est animal, et per quam est homo. Manifestum est autem quod unumquodque genus consequuntur propria accidentia. Sicut ergo materia praeintelligitur perfecta secundum esse ante intellectum corporeitatis, et sic de aliis; ita praeintelliguntur accidentia quae sunt propria entis, ante corporeitatem. Et sic praeintelliguntur dispositiones in materia ante formam, non quantum ad omnem eius effectum, sed quantum ad posteriorem. *ST* I, q. 76, a. 6, *ad* 1*um*, vol. 5, p. 229.

[45] ...dicendum quod dimensiones quantitativae sunt accidentia consequentia corporeitatem, quae toti materiae convenit. Unde materia iam intellecta sub corporeitate et dimensionibus, potest intelligi ut distincta in diversas partes, ut sic accipiat diversas formas secundum ulteriores perfectionis gradus. Quamvis enim eadem forma sit secundum essentiam quae diversos perfectionis gradus materiae attribuit, ut dictum est; tamen secundum considerationem rationis differt. *ST* I, q. 76, a. 6, *ad* 2*um*, vol. 5, p. 229.

proper dispositions before we can understand the higher levels of perfection to be in first matter. For example, not only is it necessary to understand first matter to have the perfection of animate existence before we can understand it to have the perfection of sentient existence, but also the diverse organs or tools which necessarily follow from the perfection of animate existence must be pre-understood as proper dispositions before we can understand the perfection of sentient existence to be in first matter.[46]

Now, as St. Thomas points out, "quantitative dimensions are accidents following from corporeity which belongs to the whole of matter." As a result, insofar as we understand the whole of first matter to be under corporeity and the quantitative dimensions which necessarily follow from it, we can understand first matter to be distinguishable or divisible and, hence, capable of individuating "diverse forms according to the higher levels of perfection." Nor is this to posit that quantity or any other accident can be in first matter before substantial form.[47] Rather, as St. Thomas says in another text, it is to affirm that "in a certain way one and the same form, insofar as it constitutes matter in act at a lower level, is between matter and itself, insofar as it constitutes matter

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[46] On this point, see *De anima*, q. 9, vol. 24, 1, pp. 75-86. This very issue will be treated with more determination in chapter nine.

[47] The following text from Bobik is quite profound and helps to illumine what we have established up to this point. He writes: "Quantity, like every material *per se* or proper accident, is in the composite (as in a *subjectum quod*) and in prime matter (as in a *subjectum quo*); and this because of the quasi-active causality of the substantial form (see: S.T., I, q. 77, a. 6). The composite (or *subjectum quod*) individuates its quantity considered *qua* accidental form. Quantity, on the other hand, considered *qua* quantity, individuates its subject, both the *subjectum quo* and the *subjectum quod*. Although there is a reciprocal individuation between the subject (composite) and its quantity, it is not circular; for in each direction it is individuation in a different respect. Quantity *qua* quantity individuates its subject; quantity *qua accidental form* (and *not qua* quantity) is individuated by its subject. In other words, *this* quantity can be distinct and divided from *that* quantity because this quantity is an *accidental form* of this subject, and that of that subject. But *this* subject can be distinct or divided from *that* subject, because of the presence in each of an accidental *form to whose distinctive nature belongs divisibility*." From, "St. Thomas on the Individuation of Bodily Substances," in *Readings in the Philosophy of Nature*, p. 340.

in act at a higher level."[48]

Now that we have answered both of the questions raised above, we can return to our response to the third part of Byrne's objection. Not only do we grant the truth of his minor premise, as stated above, but we also grant both the truth of his major premise, namely, "whatever is pure passive ability cannot be the principle of individuation of many substances of the same kind." Thus, we grant the truth of his conclusion, that is, that "first matter cannot be the principle of individuation of many substances of the same kind."[49] We grant the truth of Byrne's entire argument for, as we have just observed, the doctrine of St. Thomas is that first matter as such cannot in fact be the principle of individuation. On the contrary, we have seen that the Angelic Doctor teaches that it is only insofar as first matter is considered as subject to the perfection of corporeity and insofar as the dimensions which necessarily follow from this perfection are considered as indeterminate that we can speak of first matter as the principle of individuation of many substances of the same kind. Thus, rather than refuting the traditional doctrine concerning first matter, the third part of Byrne's objection unwittingly agrees with this doctrine and refutes only a misunderstanding of it.

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[48] ...quodammodo una et eadem forma, secundum quod constituit materiam in actu inferioris gradus, est media inter materiam et seipsam, secundum quod constituit eam in actu superioris gradus. *De anima*, q. 9, vol. 24, 1, p. 81.

Thus, Bobik can say: "Substantial form, informing prime matter, extends the resulting composite three-dimensionally by reason of its grade of corporeity. In a very true sense, the substantial form is the active substantial root of individuation, just as prime matter is the passive substantial root. A bodily substance extends itself through the quasi-active (i.e., quasi-efficient) causality of its substantial form. It receives this extendedness into itself and maintains this extendedness within itself through its matter. Thus the origins of the individuation of *substantial* natures are on the substantial level. This appears to be what St. Thomas has in mind when he writes that it is *not* quantity, but *matter as quantified*, which is the principle of individuation." See, once again, "St. Thomas on the Individuation of Bodily Substances," in *Readings in the Philosophy of Nature*, p. 335.

[49] If it turns out that by saying, "first matter cannot be the principle of individuation of many substances of the same kind," Byrne means to say that "first matter cannot be the *first* principle of individuation of many substances of the same kind," then we would deny the truth of his conclusion since what would be his major premise in that case, namely, "whatever is pure passive ability cannot be the *first* principle of individuation of many substances of the same kind," would be false. For, as was noted above, first matter is indeed the *first* principle of the individuation of natural substances, while quantity is a secondary principle of individuation.

Having seen this, it follows that the third part of Byrne's objection fails to touch its target. But we showed above that the first two parts of Byrne's objection also fail to touch the traditional doctrine concerning first matter. Hence, we can conclude that Byrne's threefold objection, taken as a whole, has been refuted. Nevertheless, as was the case with Kronen's objections, Byrne's threefold objection has caused us to make more explicit certain aspects of St. Thomas's teaching regarding the *principia naturae* which have heretofore remained only implicit. As a result, it is clear that it has been philosophically worthwhile to examine and think through Byrne's arguments in this context.

## 7. Résumé

In this chapter our end was to examine and respond to the objections brought forth by John Kronen and Christopher Byrne against St. Thomas's teaching on the nature of first matter. As we saw, Kronen argues that, in the case of composite substances (e.g., men, horses, oak trees), substantial form does not immediately inform first matter, but rather "a plurality of lesser substances." He is driven to this, in part, because he maintains that the parts of such substances each have their own distinct being. Thus, he sees substantial form as a "substantial quality" which strips the plurality of lesser substances of their independence and causes them to exist as constituent parts of the composite substance. Further, Kronen maintains that whoever maintains that the Incarnation is possible, must also grant that his position is possible.

In our response to Kronen, we showed that his view of first matter finally denies the substantial unity of every composite substance, a conclusion which Kronen himself seems to oppose. Further, we saw that Kronen's view of substantial form, like Avicebron's before him,

fails to distinguish properly between substantial form and accidental form. In addition, we noted that if Kronen had posited, with St. Thomas, that a substantial form can be simple in its essence, yet manifold in its powers, many of his difficulties could have been avoided. Finally, we showed that belief in the possibility of the Incarnation in no way implies that one must grant the possibility of Kronen's position.

Christopher Byrne sets forth a three-fold objection wherein he maintains that if we posit that first matter is pure passive ability, then we do away with its ability to be what underlies substantial becoming, to be what underlies the essential and accidental properties in a natural substance, and to be what individuates numerically distinct natural substances of a given kind. In reply to the first part of his objection, we argue that Byrne, like Plato before him, fails to distinguish between first matter and privation. Thus, he wrongly understands first matter to be a sort of non-being, rather than to be the *aliquid positive* which we showed it to be in chapter six. Regarding the second part of this objection, we examined St. Thomas's *De ente* in order to show, *contra* Byrne, that the traditional teaching holds that it is natural substance itself, and not first matter, which underlies the essential and accidental properties found in a thing. Lastly, we showed that Byrne's understanding of the traditional teaching regarding matter as the principle of individuation is likewise faulty. For it is matter subject to quantity, and not first matter as such, which is able to individuate substantial forms of a given kind.

## Chapter Nine: More Objections and Replies

In this chapter we shall examine two more articles which, by contrast to the ones examined in the previous chapter, raise objections principally against St. Thomas's understanding of the nature of substantial form. The first of these articles is Gordon Barnes's "The Paradoxes of Hylomorphism."[1] In this article Barnes attempts to show that any proponent of the traditional doctrine of hylomorphism (e.g., St. Thomas Aquinas) has to come to terms with various paradoxes which seem to follow from his position. Here we shall examine one such alleged paradox as well as Barnes's proposed solution to it.

### 1. Gordon Barnes's Objection against St. Thomas's Teaching on the Nature of Substantial Form

The first part of Barnes's paradox consists in an argument for a real distinction between substantial form and the substance of which substantial form is an essential part. This argument, however, presupposes that there is indeed a real distinction between substantial form and first matter which together constitute a substance. Here is Barnes's argument for that real distinction:

> (10) If the correct account of a real, mind-independent occurrence requires a distinction between two things, A and B, then the distinction between A and B is a real distinction.
>
> (11) Substantial change is a real, mind-independent occurrence, and the correct account of substantial change requires a distinction between the form and the matter of an individual substance.
>
> (12) Therefore the distinction between the form and the matter of an individual

[1] Gordon P. Barnes, "The Paradoxes of Hylomorphism," *The Review of Metaphysics* 56 (2003), pp. 501-523.

substance is a real distinction.[2]

Explaining this argument, Barnes says:

> The distinction between matter and form involved in the account of substantial change essentially involves the separability of the matter from the substantial form of a particular substance. The hylomorphic account of both generation and corruption essentially involves the separation of matter from the substantial form. In the case of generation, the matter that is potentially a thing of a certain kind preexists the substantial form that actualizes its potential to be a thing of that kind. So the account of generation involves the separation of matter and form insofar as the matter preexists the form. Likewise, the hylomorphic account of corruption essentially involves the separability of the matter and the form of an individual substance insofar as the matter postexists the substantial form of the substance that is destroyed. Now, assuming that the separability of two things logically entails a real distinction between them, then if the matter and the form of an individual substance are separable in reality (because their separation is precisely what constitutes substantial change) then the matter and the form of an individual substance are really distinct.[3]

This argument employed by Barnes seems to be quite close to the argument from St. Thomas which we utilized in chapter six in order to show that the three principles of becoming are distinct from each other. Now by using the real distinction between substantial form and first matter as a premise, Barnes goes on to argue that there must be a real distinction between substantial form and the substance of which it is an essential part. Stating this argument, Barnes writes:

> (13) If the substantial form is really distinct from the matter of the individual substance, and the matter is a real, metaphysical constituent of the individual substance, then the substantial form cannot be really identical with the individual substance, since there is something more to the individual substance than its substantial form.
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> (14) The substantial form is really distinct from the matter of the individual substance, and the matter is a real, metaphysical constituent of the individual substance.

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[2] *Ibid.*, p. 510.

[3] *Ibid.*, p. 511.

(15) Therefore the substantial form cannot be really identical with the individual substance.[4]

Having established this, Barnes proceeds to posit that it can also be shown that there is only a distinction of reason between substantial form and the substance of which it is an essential part. His argument for this is the following:

> I believe that there is one powerful argument for a mere distinction of reason between the substantial form and the individual substance. It is simply this.
>
> (16) If the actualization of the potential for humanity is really distinct from the particular human being, then the actualization must be really distinct from the matter that composes the human being as well, and thus the human being is not really one thing, but two distinct things, with only accidental unity.
>
> (17) A human being is not two distinct things, with only accidental unity, but one thing -- an *ens per se.*
>
> (18) Therefore the actualization of the potential for humanity is not really distinct from the particular human being. It is distinct only in reason.

It is plain that the key premise in this argument is the first one. Seeing this, Barnes provides his reader with an argument for this premise. Regarding this, he maintains:

> The argument for premise (16) is this. If the actualization of the potential for humanity is really distinct from the particular human being, then it must be because there is some real difference between the two. But the only candidate for a real difference between the two is the material principle of the particular human being. But if the material principle distinguishes the actualization of humanity from the particular human being, it must be that the material principle is also really distinct from the actualization of humanity. But if the actualization of humanity is really distinct from the material principle, then a human being is not really one thing *per se*, but only an accidental unity of two distinct things. This argument identifies the strongest reason, from the point of view of a hylomorphist, for maintaining that the distinction here is a mere distinction of reason. Simply put, any stronger distinction seems to threaten the intrinsic unity of the human being, which is supposed to be one

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[4] *Ibid.*, p. 512.

of the principal advantages of hylomorphism.[5]

Having come to this point, Barnes now puts together the two parts of his argument and, in so doing, formulates his paradox. He writes:

> With this argument, we have the paradox before us, and I believe that it should worry any would-be hylomorphist. We seem to have equally cogent arguments for two contradictory conclusions. We have reason to believe that the substantial form is really distinct from the individual substance, and we also have reason to believe that the substantial form is really identical with the individual substance. It cannot be the case that both of these conclusions are true. Hence the paradox. However, I believe that there are real prospects for a resolution of the paradox.[6]

The essence of Barnes's argument seems, then, to come to this: every traditional hylomorphist must hold both that there is a real distinction between substantial form and first matter, and that every human being is a substance. But if one maintains that there is a real distinction between substantial form and first matter, then, Barnes concludes, one must also posit that there is a real distinction between substantial form and the substance of which it is an essential part. And if one maintains that every human being is a substance, then, Barnes says, one must also hold that there is merely a distinction of reason between substantial form and the substance of which it is an essential part. As a result, Barnes concludes that every traditional hylomorphist must think that two contradictory statements are true, to wit, that there both is and is not a real distinction between substantial form and the substance of which it is an essential part (or, put otherwise, there both is and is not a mere distinction of reason between substantial form and the substance of which it is an essential part).

Having laid all of this down, Barnes points out that those who hold to the traditional doctrine

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[5] *Ibid.*, pp. 515-516.

[6] *Ibid.*, p. 516.

of hylomorphism might deny the second part of his paradox, namely, that if we hold that every human being is a substance, then we must deny that there is a real distinction between substantial form and the substance of which it is an essential part (and, by implication, deny that there is a real distinction between substantial form and first matter). Addressing a possible response that the traditional hylomorphist might give to the second part of his paradox, Barnes states:

> Ever since Aristotle, hylomorphists have suggested that the unity of matter and form in a single substance follows from their natures as potentiality and actuality. The idea is that potentiality and actuality are complementary entities, naturally suited to compose a single, individual substance, and so we need no explanation of their unity. Their unity is simply a by-product of their very natures as potentiality and actuality. Now, one way of spelling out this solution is to deny that the potentiality and the actuality of a particular substance are really distinct from one another. Rather, they are simply two aspects of one and the same thing. However, we have already rejected that solution. So is there a way of developing this solution that is consistent with the real distinction between matter and form in a substance?
>
> It seems doubtful. As long as we consistently recognize that the potentiality and the actuality of a substance are real, and really distinct from one another, they would seem to have just as much claim to be two things and not just one thing, as any other two realities. The idea that potentiality and actuality naturally combine into a single unified substance trades on a tendency to slip back into talking about them as if they were not really distinct at all, but only distinct in reason. However, that is a solution that we have already rejected. Once we accept the reality of and the real distinction between these two entities, it is not clear why they should be immune from the same worries about unity as apply to any other two realities. So I think that this common solution to the problem of the substantial unity of matter and form is unsuccessful.[7]

Here Barnes states that the possible response would consist in saying that, owing to their natures as

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[7] *Ibid.*, p. 517. Barnes goes on to point out that, in his mind, "this is not the only reason for rejecting this alleged solution to the problem. The other reason is that the matter that composes a human being is not a mere potentiality" (*Ibid.*, p. 517) For, he states, "there are microscopic particles that exist in a living human body, and these microscopic particles must have their own identity and essence, independently of their function in the human organism" (*Ibid.*, p. 518). We shall refrain here from answering this part of Barnes's argument against St. Thomas's understanding of the principles of nature for two reasons. First, an adequate answer to this argument necessarily involves an explication of the doctrine of presence by power or virtual presence which we shall provide below in answering Nichols's objections to St. Thomas's teaching. Second, Michael Storck has recently provided what seems to be a sound refutation of this part of Barnes's argument. See his "Parts, Wholes, and Presence by Power: A Response to Gordon P. Barnes," *The Review of Metaphysics* 62 (2008), pp. 45-59.

act and ability, substantial form and first matter are able to constitute a natural substance. How, though, does this response fit with the real distinction between these same two principles? Barnes holds that it simply does not fit. In other words, Barnes maintains that, insofar as they are both real and really distinct from each other, substantial form and first matter "have just as much claim to be two things and not just one thing, as any other two realities." That is, once we grant that substantial form and first matter are both real and really distinct, then, in truth, it follows that they are as two as are Mr. Smith and Mrs. Smith.

Put syllogistically, Barnes's position would seem to read thus: things that are really distinct cannot constitute a substance. But substantial form and first matter are things which are really distinct. Thus, substantial form and first matter cannot constitute a substance. According to Barnes, then, to maintain that substantial form and first matter have some sort of privileged standing, insofar as they are to each other as act is to ability, is finally to deny that they are really distinct things after all. Thus, says Barnes, "this common solution to the problem of the substantial unity of matter and form is unsuccessful."

## 2. Reply to Barnes's Objection

How, then, are we to resolve the paradox that Barnes has placed before us? In order to do so, we shall attempt to resuscitate the response of the would-be traditional hylomorphist to the second part of Barnes's paradox. For, while it seems that Barnes has correctly identified the weaker part of his argument, it also seems that he has failed to articulate the full response which the traditional hylomorphist is capable of giving to this part of his argument.

Let us begin by recalling here something essential about the proper *modus procedendi* which

is required in order to come to an understanding of the *principia naturae*. Both in chapter three and at the end of chapter seven we noted that if we are to know composite things in terms of their principles and causes, then, given our mode of knowing, we must travel over the way of resolution before we travel over the way of composition. In other words, because composed things or principled things are more known to us than are their respective indivisible parts or principles, we can only come to know the latter through first knowing the former.

Now when we resolve a natural substance into its proper inward principles and causes (i.e., substantial form and first matter), as we did in chapter six, we not only see that these principles together constitute a natural substance, but we also see that these same principles are really distinct from each other. That is, by traveling over the way of resolution, we come to see *per modum demonstrationis* that the same two principles which constitute a natural substance are also really distinct from each other. Hence, assuming that what is laid down in chapter six is correct, we can claim to know that the conclusion in the above syllogistic formulation of Barnes's position must be false, and this because of the falsehood of Barnes's major premise.

Now the precise problem with Barnes's major premise seems to be that he has failed to distinguish between things (i.e., substances) and principles of things (i.e., principles of substances).[8]

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[8] On this point see Fr. Francis McMahon, "Being and Principles of Being," pp. 322-339. In his essay, Fr. McMahon cites the following text from St. Thomas: "multis error accidit circa formas ex hoc quod de eis iudicant sicut de substantiis iudicatur. Quod quidem ex hoc contingere videtur, quod formae per modum substantiarum signantur in abstracto, ut albedo, vel virtus, aut aliquid huiusmodi; unde aliqui modum loquendi sequentes, sic de eis iudicant ac si essent substantiae. Et ex hinc processit error tam eorum qui posuerunt latitationem formarum, quam eorum qui posuerunt formas esse a creatione. Aestimaverunt enim quod formis competeret fieri sicut competit substantiis; et ideo non invenientes ex quo formae generentur, posuerunt eas vel creari, vel praeexistere in materia; non attendentes, quod sicut esse non est formae, sed subiecti per formam, ita nec fieri, quod terminatur ad esse, est formae, sed subiecti. Sicut enim forma ens dicitur, non quia ipsa sit, si proprie loquamur, sed quia aliquid ea est; ita et forma fieri dicitur, non quia ipsa fiat, sed quia ea aliquid fit: dum scilicet subiectum reducitur de potentia in actum." *De virtutibus*, q. 1, a. 11, vol. 2, p. 739. See also, *De potentia*, q. 3, a. 8, vol. 2, pp. 61-62.

Although he would clearly deny that substantial form and first matter are understood by St. Thomas to be substances, Barnes seems to be conceiving of these principles (and imagining them as well) as if they were substances when he states: "they would seem to have just as much claim to be two things and not just one thing, as any other two realities." Now it is possible to make such a claim, only if one ignores how substantial form and first matter are first arrived at as principles of natural substance. In other words, if one follows the way of resolution, then one is forced to see that substantial form and first matter are both principles belonging to the substantial order, yet neither of them is a substance. Hence, it is not true to maintain that substantial form and first matter have "just as much claim to be two things and not just one thing," as, say, Mr. Smith and Mrs. Smith. For, unlike the latter, substantial form and first matter can neither be nor be understood without one another.[9]

Nevertheless, it is worth noting that Barnes is justified in having a difficulty with what he understands to be the position of the traditional hylomorphist. As we saw above, Barnes holds that if one intends to account for the substantial unity of natural substances in terms of the *principia naturae*, it is not enough merely to show that substantial form and first matter stand to each other as act stands to passive ability. Indeed, on this point, St. Thomas seems to agree with Barnes. For, as we observed in chapter seven, an accidental form and a substance stand to each other as act stands to passive ability. Yet these principles, taken together, can neither constitute a natural substance nor account for its undividedness. Thus, in addition to maintaining that substantial form and first matter

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[9] On this point, see *In de Trin.*, q. 5, a. 3, vol. 50, p. 149. He states: "...cum dicimus formam abstrahi a materia, non intelligitur de forma substantiali, quia forma substantialis et materia sibi correspondens dependent ad invicem, ut unum sine alio non possit intelligi, eo quod proprius actus in propria materia fit." The rational soul, of course, can be apart from its proper mattter.

stand to each other as act stands to passive ability, St. Thomas holds that these same principles must be such that neither of them has the sort of absolute existence through itself which is proper to substance. That is, substantial form and first matter must be such that "from the conjunction of both, there remains that existence in which the thing [i.e., the substance] subsists *per se* and from them it [i.e., the thing or substance] is made [to be] one *per se.*"[10]

It appears, then, that Barnes's paradox fails. For, as we have just seen, there is no contradiction involved in affirming both that substantial form and first matter are really distinct from each other and that they constitute a substance. On the contrary, a careful consideration of the way of resolution would have revealed this fact to Barnes and à close look at the natures of substantial form and first matter (precisely insofar as they are nothing more than *principles* of natural substances) would have enabled Barnes to see the imperfection in his own understanding of traditional hylomorphism on this matter.

### 3. *Excursus*: A Brief Examination of *De anima*, q. 9

Now before turning to the second article to be considered here, we shall let this reflection on the principles of substantial unity serve as an occasion to examine a text from St. Thomas which both completes what we addressed at the end of chapter eight and is propaedeutic to what we shall address in the second part of this chapter. The text that we have in mind consists of various parts of the ninth question from the *De anima* wherein St. Thomas asks, "Whether the soul is united to corporeal matter through a medium?" St. Thomas resolves this question in the following words:

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[10] "...ex coniunctione utriusque relinquitur illud esse, in quo res per se subsistit, et ex eis efficitur unum per se...," *De ente*, ch. 6, vol. 43, p. 380.

...it must be said that, among all things, existence is that which belongs to things most immediately and intimately, as is said in *The Book of Causes*. Whence, since matter has existence in act from form, it is necessary that form giving existence to matter be understood to come to matter before all other things and to be in it more immediately than all the rest. But it is proper to substantial form that it give existence simply speaking to matter. For it is that through which a thing is this very thing which is. Now through accidental forms matter does not have existence simply speaking, but existence in a certain respect; for example, it is big, or colored, or something of this sort. If, therefore, there is a form which does not give existence to matter simply speaking, but comes to matter already existing in act through some form, it will not be a substantial form. From this it is clear that between form and matter there cannot fall some intermediate substantial form, as those would have it who posit that, according to order of genera, in which one is ordered under another, there is an order of different forms in matter.... Thus, it must be said that it is through one form, numerically speaking, that a thing is a substance, that it is in its lowest species, and that it is in all intermediate genera.... And, thus, in a certain way one and the same form, insofar as it constitutes matter in act at a lower level, is between matter and itself, insofar as it constitutes matter in act at a higher level. But matter, insofar as it is understood as constituted in substantial existence according to the perfection of a lower level, can consequently be understood to be subject to accidents. For it is necessary that substance, according to that lower level of perfection, have some proper accidents which must be in it; just as from the fact that matter is made to be corporeal through forms, it immediately follows that there are dimensions in it, through which matter is understood to be divisible through diverse parts. Thus, according to its diverse parts it can be receptive of different forms. And further, from the fact that matter is understood as constituted in some [level of] substantial existence, it can be understood as receptive of the accidents by which it is disposed to a further perfection, according to which it comes to be the proper matter for the reception of the further perfection. But dispositions of this kind are pre-understood to form insofar as they are introduced by the agent into the matter, although they are certain accidents improper to form which are not caused in matter except by form itself. Hence, they are not pre-understood to form as dispositions in matter, but rather form is pre-understood to them, as a cause [is pre-understood] to its effects. Therefore, because the soul is a substantial form, since it constitutes man in a determinate species of substance, there is no other substantial form between the soul and first matter....

But because the same form which gives existence to matter is also a principle of operation, since each things acts insofar as it is in act, it is necessary that the soul, just as every other form, be also the principle of operation.... Now since the order of instruments must be according to the order of operations, but with the diverse operations which are from the soul, one naturally precedes the other, it is necessary that one part of the body be moved to its operation through another part. Thus, between the soul, insofar as it is a mover and principle of operations, and the whole

body, there falls something which is intermediary. For, through the mediation of some first part, first having been moved, it [i.e., the soul] moves other parts to their operations, just as, through the mediation of the heart, it [i.e., the soul] moves other members to their vital operations. Nevertheless, insofar as the soul gives existence to the body, it immediately gives substantial and specific existence to all of the parts of the body. And, thus, it is said by many that the soul, as a form, is united to the body without a middle, but, as a mover, [the soul moves certain parts of the body] through a middle....[11]

This question contains a two-fold consideration of the rational soul. While the first part considers

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[11] Dicendum quod inter omnia, esse est illud quod immediatius et intimius convenit rebus, ut dicitur in Lib. de causis; unde oportet, cum materia habeat esse actu per formam, quod forma dans esse materiae, ante omnia intelligatur advenire materiae, et immediatius ceteris sibi inesse. Est autem hoc proprium formae substantialis quod det materiae esse simpliciter; ipsa enim est per quam res est hoc ipsum quod est. Non autem per formas accidentales habet esse simpliciter, sed esse secundum quid: puta esse magnum, vel coloratum, vel aliquid tale. Si qua ergo forma est quae non det materiae esse simpliciter, sed adveniat materiae iam existenti in actu per aliquam formam, non erit forma substantialis. Ex quo patet quod inter formam substantialem et materiam non potest cadere aliqua forma substantialis media, sicut quidam voluerunt, ponentes quod secundum ordinem generum, quorum unum sub altero ordinatur, est ordo diversarum formarum in materia...Oportet igitur dicere, quod eadem numero forma sit per quam res habet quod sit substantia, et quod sit in ultima specie specialissima, et in omnibus intermediis generibus...et sic quodammodo una et eadem forma, secundum quod constituit materiam in actu inferioris gradus, est media inter materiam et seipsam, secundum quod constituit eam in actu superioris gradus. Materia autem prout intelligitur constituta in esse substantiali secundum perfectionem inferioris gradus, per consequens intelligi potest ut accidentibus subiecta. Nam substantia secundum illum inferiorem gradum perfectionis necesse est quod habeat quaedam accidentia propria quae necesse est ei inesse. Sicut ex hoc quod materia constituitur in esse corporeo per formas, statim consequitur ut sint in ea dimensiones, per quas intelligitur materia divisibilis per diversas partes, ut sic secundum diversas sui partes possit esse susceptiva diversarum formarum. Et ulterius ex quo materia intelligitur constituta in esse quodam substantiali, intelligi potest ut susceptiva accidentium quibus disponitur ad ulteriorem perfectionem, secundum quam materia fit propria ad ulteriorem perfectionem suscipiendam. Huiusmodi autem dispositiones praeintelliguntur formae ut inductae ab agente in materiam, licet sint quaedam accidentia impropria formae, quae non nisi ex ipsa forma causentur in materia. Unde non praeintelliguntur in materia formae quasi dispositiones, sed magis forma praeintelligitur eis, sicut causa effectibus. Sic igitur cum anima sit forma substantialis, quia constituit hominem in determinata specie substantiae, non est aliqua alia forma substantialis media inter animam et materiam primam; sed homo ab ipsa anima rationali perficitur secundum diversos gradus perfectionum, ut sit scilicet corpus, et animatum corpus, et animal rationale. Sed oportet quod materia secundum quod intelligitur ut recipiens ab ipsa anima rationali perfectiones inferioris gradus, puta quod sit corpus et animatum corpus et animal, intelligatur, simul cum dispositionibus convenientibus, quod sit materia propria ad animam rationalem, secundum quod dat ultimam perfectionem. Sic igitur anima, secundum quod est forma dans esse, non habet aliquid aliud medium inter se et materiam primam.

Sed quia eadem forma quae dat esse materiae est etiam operationis principium, eo quod unumquodque agit secundum quod est actu; necesse est quod anima, sicut et quaelibet alia forma, sit etiam operationis principium.... Sed cum oporteat ordinem instrumentorum esse secundum ordinem operationum, diversarum autem operationum quae sunt ab anima, una naturaliter praecedit alteram, necessarium est quod una pars corporis moveatur per aliam ad suam operationem. Sic ergo inter animam secundum quod est motor et principium operationum et totum corpus, cadit aliquid medium; quia mediante aliqua prima parte primo mota movet alias partes ad suas operationes, sicut mediante corde movet alia membra ad vitales operationes: sed secundum quod dat esse corpori, immediate dat esse substantiale et specificum omnibus partibus corporis. Et hoc est quod a multis dicitur quod anima unitur corpori ut forma sine medio, ut motor autem per medium... *De anima*, q. 9, vol. 24, 1, pp. 79-83.

the rational soul insofar as it is man's substantial form, the second part of the article considers the rational soul insofar as it is the first principle of motion or operation in man.[12] Turning to the second part of the article first, St. Thomas clearly teaches that, when a man moves himself in this way or that, there are some intermediate parts which fall between the rational soul, as the first principle of operation in him, and the part of the man which is finally moved to operation. Giving the reason for this, he states, "since the order of instruments must be according to the order of operations, but with the diverse operations which are from the soul, one naturally precedes the other, it is necessary that one part of the body be moved to its operation through another part." In order to exemplify this, we might say that when a man sees and smells a freshly baked apple pie, his act of sensing the pie naturally precedes his act of desiring to eat the pie. Thus, it is necessary that the part(s) of his body whereby the man desires to eat the apple pie be moved to its/their operation through the parts of his body whereby he sees and smells the pie. In a similar way, since the same man's act of desiring to eat the apple pie naturally precedes his act of walking toward it, it must be the case that the parts of his body whereby he walks toward the pie be moved to their operation through the part(s) of his body whereby he desires to eat the pie.[13] It is plain, then, that, insofar as it is the first principle of operation in man, the rational soul moves certain parts of the body to their operations through the mediation of various other parts. Thus, St. Thomas fittingly says, "as a mover, [the soul moves

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[12] Regarding this, see *ST* I, q. 75, a. 1, vol. 5, pp. 194-195 .

[13] Addressing this topic in the case of brute animals, St. Thomas writes: "Est enim duplex potentia motiva animae sensitivae: una quae imperat, scilicet appetitiva, cuius actus constat, alia executiva quae affixa musculis et nervis est principium mobilitatis in eis; sed distinctio partium corporalium facit quod una pars animalis est movens et alia mota; et ita possunt moveri ex se." *Quod.* IX, q. 5, a. 1 *ad 2um*, vol. 25, 1, p. 112.

certain parts of the body] through a middle."[14]

Things are different, however, when we consider the rational soul insofar as it is man's substantial form. In the first place, St. Thomas notes that since existence simply speaking must needs belong to first matter before everything else (for nothing can be in any other way unless it first is simply speaking), and since it is through substantial form that first matter is simply speaking, "it is necessary that form giving existence to matter [i.e., substantial form] be understood to come to matter before all other things and to be in it more immediately than all the rest."

In addition to this, St. Thomas also shows that it is necessary for man to have all of the levels of substantial perfection which belong to him from one and the same substantial form. For, as was just stated, it is in virtue of his rational soul that man is simply speaking or a substance in act. Now every form which informs what already is simply speaking or what already is a substance in act is an accidental form (for such a form can only make its subject to be in a certain respect since the subject already is simply speaking). Hence, it follows that every form which informs man after he has been constituted as a being simply speaking or as a substance in act by his rational soul, is only an accidental form. Thus, with St. Thomas, we can conclude that "between form and matter there cannot fall some intermediate substantial form, as those would have it who posit that, according to

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[14] In the following text St. Thomas points out some additional ways in which something can fall between the soul as mover and the body, or part of the body, as what is moved. He writes: "Potest tamen dici aliquid esse medium inter animam et corpus, etsi non in essendo, tamen in movendo et in via generationis. In movendo quidem, quia in motu quo anima movet corpus, est quidam ordo mobilium et motorum. Anima enim omnes operationes suas efficit per suas potentias: unde mediante potentia movet corpus; et adhuc membra mediante spiritu; et ulterius unum organum mediante alio organo. In via autem generationis dispositiones ad formam praecedunt formam in materia, quamvis sint posteriores in essendo. Unde et dispositiones corporis quibus fit proprium perfectibile talis formae, hoc modo possunt dici mediae inter animam et corpus." *SCG*, Bk. 2, ch. 71, vol. 13, p. 454. The reply to the fourth objection in *De anima*, q. 9, vol. 24, 1, p. 83 is also of relevance here. There St. Thomas says: "...quantum ad illam operationem animae quae est compositi, non cadit aliquod medium inter animam et quamlibet partem corporis; sed est una pars corporis per quam primo exercet anima illam operationem quae cadit media inter animam secundum quod est principium illius operationis, et omnes alias partes corporis quae participant illam operationem." Perhaps we could say that this "one part" would be some particular organ such as the heart or a certain part of the brain.

the order of genera, in which one is ordered under another, there is an order of different forms in matter." But if this is false, then we must hold, again with St. Thomas, that "it is through one form, numerically speaking, that a thing is a substance, that it is in its lowest species, and that it is in all intermediate genera." Thus, it is in virtue of one and the same substantial form (i.e., the rational soul) that a man is simply speaking, is a body, is alive, is sentient, and is rational.[15]

But, as St. Thomas notes, once matter is understood to have a certain level of substantial perfection from the rational soul, this composite of matter and form naturally gives rise to certain proper accidents (e.g., once matter is understood to have the perfection of bodily existence this composite naturally gives rise to dimensions and once matter is understood to have the perfection of animate existence the abilities to assimilate food, to grow, and to reproduce are understood to be present in this composite as well). Hence, it is in virtue of one and the same substantial form that man has all of the levels of substantial perfection that belong to him and it is also from the union of this substantial form with man's matter that all of the proper accidents which naturally follow from these same levels of substantial perfection flow forth.[16]

Yet, even if the rational soul's union with matter is the cause of all of these effects, and this instantaneously (since substantial becoming necessarily takes place in an instant, as was shown in chapter six), we must maintain with St. Thomas that the rational soul's union with matter is

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[15] Regarding these different levels of substantial perfection, John of St. Thomas states: "Nulla datur distinctio ex natura rei formalis actu extra intellectum inter gradus istos metaphysicos, sed solum datur distinctio virtualis et fundamentalis, quae actualis redditur per intellectum." *Cursus Philosophicus*, *Log.*, p. 2, q. 3, a. 4, p. 338.

[16] Of course, as was established in chapter eight, the proper accidents of the highest level of substantial perfection given by the rational soul (i.e., the intellect and will) are proper accidents which are not in matter as in a subject. Rather, these powers of the soul are in the soul alone as in a subject (see, e.g., *ST* I, q. 77, a. 6, vol. 5, p. 246). Nonetheless, these powers are proper accidents of the substance which has the rational soul as its substantial form (i.e., man).

understood to be the cause of some of these effects before it is the cause of certain others. More specifically, we must conceive of the rational soul giving to matter the lower levels of substantial perfection (from which union of form and matter there follow the proper accidents of these lower levels of substantial perfection), before we conceive of the rational soul giving to matter the higher levels of substantial perfection (from which union of form and matter there follow the proper accidents of these higher levels of substantial perfection). For in order for us to conceive of these higher levels of substantial perfection in matter we must pre-understand the lower levels of substantial perfection and their corresponding proper accidents to already be in the same matter. For example, in order for us to conceive of a natural substance as alive (and, thus, as having the organs through which it is able to assimilate food to itself, to grow, and to reproduce), we must pre-understand this natural substance to be a body and, thus, to have dimensions or part outside of part. For if the living natural substance in question were to be conceived of without dimensions, it would also perforce be conceived of without organs (for every organ necessarily has each of its parts outside of every other one of its parts -- e.g., the left side of the human brain is necessarily outside of the right side, and so on).

Now it is because the rational soul's union with matter not only instantaneously results in there being in man all of the various levels of substantial perfection together with their attendant proper accidents, but also results in some of these levels of substantial perfection together with their attendant proper accidents being necessarily pre-understood to others, that St. Thomas can fittingly say that, "in a certain way one and the same form, insofar as it constitutes matter in act at a lower level, is between matter and itself, insofar as it constitutes matter in act at a higher level." Likewise, in the reply to the fifth objection in this article, St. Thomas writes:

> ...accidental dispositions which make matter proper for some form are not totally between form and matter. Rather, they are between form, insofar as it gives the last perfection, and matter, insofar as it has already been perfected by the perfection of a lower level. For matter, according to itself, is first with respect to the lowest level of perfection, since according to itself it is in potency to the substantial being of bodies. Nor does it require any disposition for this. But once this perfection is presupposed in matter, dispositions are required for a further perfection. Nonetheless, it must be known that the powers of the soul are proper accidents of the soul which do not exist without it. Whence, they do not have the notion of dispositions to the soul insofar as they are its powers, unless the powers of the lower part of the soul are called dispositions to a higher part of the soul, just as the powers of the vegetative soul [are dispositions] to the sensitive soul, as can be understood from the foregoing.[17]

From these texts we see that although the proper accidents which necessarily follow from matter having a certain lower level of substantial perfection are simply speaking posterior to the rational soul qua substantial form, nonetheless, these same accidents can be considered to be prior to the rational soul insofar as it gives to matter a certain higher level of substantial perfection. Thus, for example, although we can say that dimensions are simply speaking posterior (in the way in which an effect is naturally posterior to its cause) to the rational soul informing man's first matter, nonetheless, these same dimensions are conceived of as prior (in the way in which a cause is

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[17] ...dispositiones accidentales quae faciunt materiam propriam ad aliquam formam, non sunt mediae totaliter inter formam et materiam; sed inter formam secundum quod dat ultimam perfectionem, et materiam secundum quod iam est perfecta perfectione inferioris gradus. Materia enim secundum seipsam est prima respectu infimi gradus perfectionis, quia secundum seipsam est in potentia ad esse substantiale corporeum. Nec ad hoc requirit aliquam dispositionem; sed hac perfectione praesupposita in materia requiruntur dispositiones ad ulteriorem perfectionem. Tamen sciendum est, quod potentiae animae sunt accidentia propria animae, quae non sunt sine ea; unde non habent rationem dispositionum ad animam secundum quod sunt eius potentiae, nisi potentiae inferioris partis animae dicantur dispositiones ad superiorem partem, sicut potentiae animae vegetabilis ad animam sensibilem, secundum quod ex praemissis intelligi potest. *De anima*, q. 9 *ad 5um*, vol. 24, 1, p. 83. Also relevant here are the *ad 16um* and *ad 17um* of the same article. Respectively, they read: "...forma sicut non advenit materiae nisi sit facta propria per debitas dispositiones, ita cessantibus propriis dispositionibus forma in materia remanere non potest; et hoc modo unio animae ad corpus solvitur remoto calore et humiditate naturali, et aliis huiusmodi, in quantum his disponitur corpus ad susceptionem animae. Unde huiusmodi cadunt media inter animam et corpus ut dispositiones. Quod quomodo sit, dictum est supra.," and "...dimensiones non possunt intelligi in materia nisi secundum quod materia intelligitur constituta per formam substantialem in esse substantiali corporeo: quod quidem non fit per aliam formam in homine quam per animam, ut dictum est. Unde huiusmodi dimensiones non praeintelliguntur ante animam in materia totaliter, sed quantum ad ultimos gradus perfectionis, ut supra expositum est."

conceived of as naturally prior to its effect) to the rational soul insofar as it gives to matter the perfection of animate existence.[18]

Lastly, we must briefly make mention here of what St. Thomas says regarding the role of the agent cause in the coming to be of a higher substance, such as a man. Regarding the aforementioned proper accidents which follow from various lower levels of substantial perfection in matter, St. Thomas says: "...dispositions of this kind are pre-understood to form insofar as they are introduced by the agent into the matter, although they are certain accidents improper to form which are not caused in matter except by form itself." The principal point to be noted here is that, according to St. Thomas, the very same dispositions can be understood, on the one hand, to be introduced into some formed matter by an agent cause and, on the other hand, to be the effects of the substantial form which belongs to the matter in question.

Addressing the alteration or change in quality whereby an agent cause disposes a natural

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[18] Here, of course, we are dealing with the fifth meaning of "prior" or "before" and, hence, of "posterior" or "after" that Aristotle lays out in chapter twelve of the *Categories*. An apropos text from St. Thomas regarding this is the following: "...in quolibet genere causae, causa naturaliter est prior causato. Contingit autem secundum diversa genera causarum idem respectu eiusdem esse causam et causatum; sicut purgatio est causa sanitatis in genere causae efficientis, sanitas vero est causa purgationis secundum genus causae finalis; similiter materia causa est formae aliquo modo in quantum sustinet formam, et forma est aliquo modo causa materiae in quantum dat materiae esse actu. Et ideo nihil prohibet aliquid altero esse prius et posterius secundum diversum genus causae. Sed tamen illud est prius simpliciter dicendum ordine naturae, quod est prius secundum genus illius causae quae est prior in ratione causalitatis; sicut finis, qui dicitur causa causarum, quia a causa finali omnes aliae causae recipiunt quod sint causae: quia efficiens non agit nisi propter finem, et ex actione efficientis forma perficit materiam, et materia sustinet formam." *De veritate*, q. 28, a. 7, vol. 22, pp. 839-840. From the same work, see also q. 28, a. 8 and q. 9, a. 3 *ad 6um*.

The realization that one and the same thing can be considered to be before substantial form in the genus of material causality but after substantial form in the genus of formal causality can aid one in properly understanding various texts from St. Thomas wherein he seems to say that the rational soul can only be united to the body after it has received all of the requisite dispositions. For example, in *De veritate*, q. 8, a. 3, vol. 22, p. 225, St. Thomas writes: "Perfectibile autem non unitur formae nisi postquam est in ipso dispositio, quae facit perfectibile receptivum talis formae; quia proprius actus fit in propria potentia; sicut corpus non unitur animae ut formae, nisi postquam fuerit organizatum et dispositum." See also *De potentia*, q. 3, a. 12, vol. 2, p. 77. In *Cursus Philosophicus, Nat. Phil.*, p. 4, q. 1, a. 1, p. 16, John of St. Thomas makes a distinction which might enable one to read these texts with the first meaning of "before" and "after" in mind. On this matter see also Cajetan's *Commentaria in Summa Theologiae* on *ST* I, q. 76, a. 6, vol. 5, p. 230.

substance of one kind to become a natural substance of another kind, St. Thomas writes:

> ...instantaneous changes in natural things are always the termini of motions. The reason for this is that changes of this sort have as their terms form and privation, just as the coming to be of fire [has] fire and non-fire [as its terms]. But there cannot be anything between form and privation except accidentally. Now this happens insofar as what is deprived of form more and less approaches form by reason of some disposition to form which is increased or decreased through some continuous motion. And, thus, there must pre-exist the motion of alteration which terminates at generation. And, thus, alteration has two terms: one of its own genus, namely the last disposition, which necessitates [the introduction of] form, since alteration is motion in quality; and another of some other genus, namely substantial form.[19]

From this text we see that it is by qualitatively changing a substance that an agent cause brings about a disposition which is not only its own effect, but also the effect of some new substantial form which is necessitated by the introduction of this "last disposition." Thus, when a man uses fire to light the tobacco in his pipe, the man, through the instrumentality of the fire, heats the tobacco until a certain last disposition is arrived at. This last disposition (i.e., a certain level of heat) is both the terminus of the heating of the tobacco, which is brought about the by man lighting the pipe, and the effect of the substantial form of the new fire which has just been educed from the ability of the first matter in the tobacco.[20]

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[19] ...in rebus naturalibus mutationes instantaneae sunt termini motus semper; cuius ratio est, quia huiusmodi mutationes habent pro terminis formam et privationem, sicut generatio ignis ignem et non ignem. Inter formam autem et privationem non potest esse aliquod medium nisi per accidens; in quantum scilicet illud quod privatur forma, magis et minus appropinquat ad formam, ratione alicuius dispositionis ad formam, quae intenditur vel remittitur per motum continuum. Et ideo oportet praeexistere motum alterationis, qui terminetur ad generationem. Et sic alteratio habet duos terminos: unum sui generis, scilicet ultimam dispositionem, quae est necessitas ad formam, quia alteratio est motus in qualitate; et alium alterius generis, scilicet formam substantialem. *Quod.* VII, q. 4, a. 2.

What St. Thomas calls here the "last disposition" seems to be one in number with what he calls in other places the "proper disposition." He speaks of the latter in the following text, for example: " Omnis forma substantialis propriam dispositionem in materia requirit, sine qua esse non potest: unde alteratio est via ad generationem et corruptionem." *De mixtione,* vol. 43, p. 155, lines 37-40. The name, "last disposition," seems to name the disposition in question insofar as it is the terminus of a certain alteration while the name, "proper disposition," seems to name it insofar as it is proper to a certain kind of substantial form.

[20] St. Thomas puts expresses this matter well in the following text: "...dicendum quod dispositio se habet ad perfectionem dupliciter, uno modo, sicut via ducens in perfectionem; alio modo, sicut effectus a perfectione

The second part of the ninth article from St. Thomas's *De anima* shows, then, both that the rational soul is immediately united to first matter and that "it is necessary that matter be understood together with the appropriate dispositions, such that it be the proper matter for the rational soul according as it gives the last perfection." Further, this article also makes it evident that the same dispositions can both be introduced into some formed matter by an agent cause and be the effects of the substantial form which belongs to that same matter.

## 4. Terence Nichols's Objections against St. Thomas's Understanding of the Nature of Substantial Form

At this point, let us turn to an examination of the second article to be addressed here. The article we have in mind is Terence Nichols's "Aquinas's Concept of Substantial Form and Modern

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procedens. Per calorem enim disponitur materia ad suscipiendum formam ignis, qua tamen adveniente, calor non cessat, sed remanet quasi quidam effectus talis formae. Et similiter opinio, ex syllogismo dialectico causata, est via ad scientiam, quae per demonstrationem acquiritur, qua tamen acquisita, potest remanere cognitio quae est per syllogismum dialecticum, quasi consequens scientiam demonstrativam quae est per causam; quia ille qui cognoscit causam, ex hoc etiam magis potest cognoscere signa probabilia, ex quibus procedit dialecticus syllogismus. Et similiter in Christo simul cum scientia beatitudinis manet scientia indita, non quasi via ad beatitudinem, sed quasi per beatitudinem confirmata." *ST* III, q. 9, a. 3 *ad* 2*um*, vol. 11, pp. 142-143. See also, *In Sent.*, Bk. 2, d. 24, q. 3, a. 6 *ad* 6*um*, vol. 2, p. 634.

Here we might raise this question: When the chef puts the lobster into the pot of boiling water, does he bring about a last disposition (i.e., a certain level of heat) which is not only his effect, but also the effect of some new substantial form (i.e., the substantial form of the remains of the lobster)? It seems that the answer to this question must be in the negative. For although the certain level of heat is the terminus of the chef's act of heating the lobster, this same level of heat does not seem to follow from the substantial form of the remains of the lobster (assuming, of course, that there is only one substance here). A sign of this is that what used to be the lobster cools down as it needs to in order to be consumed. Perhaps it would be more proper to say that this level of heat follows not from the form of the remains of the lobster, but rather from its matter. On this point, the following text from Cajetan is instructive: "...dicitur quod figura, cicatrix, et hujusmodi, producuntur consecutive, et per accidens, a generatione eorum subjectum, scilicet cadaver: nec est verum, quod sola illa accidentia generentur consecutive, quae sequuntur formam; sed multa accidentia sequuntur compositum ex necessitate materiae, quae sunt, licet non incompossibilia: aliqualiter tamen opposita ipsi formae, ut patet de se. Et ideo dico, quod figura et similia sequuntur cadaver ex necessitate materiae, quia scilicet agens naturale non potest tam cito dispositiones per tot transmutationes radicatas corrumpere totaliter, et ideo similes dispositiones sequuntur: et quia non sunt facientes pro forma geniti, ideo ad corruptionem properatur." *Commentaria in De Ente et Essentia*, ch. 7, p. 557.

Science."[21] In this article Nichols brings forward various observations made by modern science which appear to vitiate St. Thomas's teachings on the nature of substantial form. These observations are essentially three in number and from them Nichols constructs a general objection against the Thomistic doctrine of substantial form. The first observation which Nichols presents is as follows:

> Modern Thomists continue to follow Thomas in affirming that only one substantial form informs the matter of an organism, which is therefore said to be one substance. The organism, of course, has parts such as cells, tissues, organs, etc.; these are said to be parts of a substance (rather than accidents). Thus the cells and organs of a human being are parts of the substance which is the person. But what about the water in the blood or cells – is this a part of the substance, or an independent substance included in the body? If one holds, as Thomas did, that there is only one substantial form in the (human) body, then there cannot also be other, separate substances, else the person would be an aggregate, not a substance. But modern anatomy and physiology tell us that blood is a fluid made up of water, which is the carrier and solvent of various suspended cells, platelets, and dissolved solutes (e.g., sodium chloride); blood plasma, which is the blood fluid separated from the suspended elements, is about 90% water. Similarly, in the so-called intracellular fluid in the cells water is the solvent for solutes and carrier for suspended semi-solid elements. Modern Thomists will typically argue that water is not present *as such* (that is, as a separate substance) in the body. Rather, water is said to be "virtually present," as St. Thomas affirmed. But it seems hard to deny that water is present as water in the blood and cells. It has not undergone a substantial change and become something else... Indeed, if the water in the blood or cells were not water as such, it could not function as a solvent for salts. Yet, if it is water, it seems that there is more than one substantial form in the body....In fact, water in the blood or cells seems to be regulated by the overall form of the body and is only accidentally, not substantially modified: that is, it behaves, on the one hand, as part of a larger substance and, on the other, as an independent substance with its own characteristics. It is both a part of a larger whole and a kind of whole itself.
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> To describe this paradox of partial autonomy and partial participation in a larger whole, Arthur Koestler has coined the term *holon*: that which is both part of a larger whole and itself a quasi-autonomous whole.[22]

The basic observation that Nichols makes here is that when water is digested and becomes part of

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[21] Terence Nichols, "Aquinas's Concept of Substantial Form and Modern Science," *International Philosophical Quarterly*, 36 (1996): pp. 303-318.

[22] *Ibid.*, pp. 312-313.

a man's blood and cells, his blood and cells have some of the properties of water (e.g., the ability to dissolve salt). But Nichols maintains that only water existing in act can have the properties of water (e.g., the ability to dissolve salt). Thus, if one finds some of the properties of water existing somewhere, one knows that he has also found water existing in act. Hence, from this it follows that part of a man's blood and cells has the nature of water just as much as does the water which is in a drinking glass. In other words, part of a man's substance is some other independently existing substance (i.e., water).

Nor is it enough, says Nichols, to hold that the water which is in blood and cells is only "virtually present" (and, thus, not present as such or as water). For to say this would imply that the water underwent a substantial change when it became part of a man. But it is clear that no substantial change has occurred, says Nichols. For, again, wherever one finds some of the properties of water, one also finds water existing in act. Hence, it must be said, holds Nichols, that the water which is in a man's blood and cells is both an independent substance with its own characteristics and a part of a man's substance. Such water is, thus, a "*holon*," or, as he will more aptly term it below, a "subsidiary whole" (i.e., an independent substance with its own characteristics which is part of a larger substance).

The second observation which Nichols presents has to do with organ transplants and related phenomena. He writes:

> Most of the subsidiary parts of an organism seem to function as holons. Organs such as the heart, can be kept alive *in vitro* and transplanted into another body; so can blood, hemoglobin, etc. These then have the character of sub-wholes. They possess a certain structural and functional autonomy of their own, including the ability to regulate the cells and molecules of which they are composed (a heart *in vitro* will even beat but erratically); yet, within the body they are regulated by the larger system of the body. They are wholes but also parts. Note that in this type of hierarchy there

> is a dual causality: a "bottom up" (reductionist) causality, in which the parts influence the whole, and a holistic causality, in which the whole organizes and constrains the parts.

The basic truth of experience which Nichols presents here is that various parts of a man, such as his heart, "can be kept alive *in vitro* and transplanted into another body." What this shows, he says, is that the heart and other organs, when removed, have a "certain structural and functional autonomy of their own." In other words, when separated, the heart and other organs manifest that they have a certain life and operation which is proper to them. This is evidence, then, according to Nichols, that many of man's organs are both substances in their own right, with their own characteristics, and parts of a larger substance. Many of man's organs, therefore, are "subsidiary wholes."

The third and final observation which Nichols brings forth comes from what modern science has been able to determine about man's genes. Regarding this Nichols states:

> Another such example is the status and activity of the genetic material in the human person. In any person the genetic material is inherited from both parents – half of the chromosomes come from each parent.... But genes...contribute positive characteristics to the person (some recent research estimates that fifty percent of a person's characteristics may be due to genetic influence). Not only gender but many other physical and mental characteristics appear to be controlled partly or mostly by genetic inheritance. Now, given the Thomistic paradigm of substantial form, how would this be explained?... The DNA strand, which is first part of the ovum and then part of the zygote, would have to be considered an accidental form that persists through a substantial change (the ovum becomes a zygote, and a new substance). But Aquinas, according to Marilyn McCord Adams, denies that accidents persist through substantial change at all: "an accident is multiplied according to the division of the subject in which it exists. Thus this whiteness is other than that insofar as this belongs to this and that to that..." Furthermore, an accident is supposed to be an expression of that substance, not something with its own independent activity which determines part of the characteristics of the substance. But in this case the gene exercises a causative activity which determines some of the characteristics of the substance. And this gene came to the new substance (the child) from without.
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> Generally speaking, Thomas's philosophy attributes all activity to form, whereas the matter is seen as mere potentiality. Parts of a substance (e.g., arms) are seen as instrumental parts through which the substance (and hence the form)

> expresses itself. But in the case of genes there is a part that acts as a center of formative activity. One could argue that the substantial form expresses itself through the genes; in the above case, however, the gene was not created by the substance but incorporated into it. In short, a part is acting not as an instrument of the whole but as a subsidiary unit which affects the character of the whole. Like the water in the blood, the gene is a part, but it also has characteristics of an autonomous unit. In Koestler's terminology, it is a holon.[23]

Here Nichols begins with the basic observation that a given man's genetic material is something which he receives from both of this parents, "half of the chromosomes come from each parent." Further, Nichols notes that this genetic material which a man receives from his parents causally determines many of his positive characteristics (e.g., gender, skin color, and so forth).

The question then arises: How can this truth be reconciled with St. Thomas's understanding of the nature of substantial form? Nichols raises two possible answers to this question. First, perhaps each strand of DNA may be understood to be an accidental form which survives the substantial becoming whereby human reproductive materials become a man. This, however, seems impossible since no accidental form survives a substantial change. Second, perhaps the genetic material in question may be posited to be so many instrumental parts through which the newly formed substance (and, thus, its substantial form) expresses itself. In other words, perhaps a man's genes are amongst his conjoined tools, together with his arms, legs, and other such parts. But this possibility too seems problematic. For such a view assumes that the substantial form of the man is in some way prior to the parts through which it expresses itself, whereas here we understand the genetic material to be prior, at least in time, even to the substantial form of the man.

Now that he has argued against these two possibilities, Nichols states that this genetic material seems to consist in many independent substances with their own characteristics which, in

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[23] *Ibid.*, pp. 313-314.

turn, become parts of some larger substance. In other words, a gene, claims Nichols, is a *holon* or a "subsidiary whole."

Having raised all three of these observations from modern science, Nichols now describes how he believes St. Thomas's understanding of substantial form must be modified so as to fit the facts. Regarding this, he states:

> In fact, Aquinas's line of thought concerning the influence of the parts (or matter) on the whole is not nearly so fully developed as is his treatment of form itself. Thus, I would propose, in light of modern research on the relation of wholes and parts, that his philosophy could be "creatively completed" in the direction of what might be called *subsidiarity*, as Clarke has done in the area of *relationality*. This need not involve any sacrifice of St. Thomas's essential insight that in an organism there is a unicity of substantial form: he is correct in this affirmation. But the relation of subsidiary composites to this superintending form needs to be made more clear....
>
> Such a project may well entail a modification or replacement of substance-accident language in order to achieve a more precise conceptual system. For substance-accident language, which is based on common sense, is not really adequate to describe fully the complex relation between parts and wholes which modern research has exposed. Is the water in the blood (1) a separate substance, (2) a part of the substance of the body, or (3) an accident? If we hold (1), we have destroyed the unicity of substantial form in the body and made it into an aggregate. If (2), then we have to maintain that the water has undergone a substantial change and become something else, which is clearly not the case. If (3), again we have to argue that the water has become something else, a part of another. Similar problems arise in explaining the action of a gene....
>
> If Thomism continues to retain substance-accident language (as it probably will), I propose that a third category be added to the categories of substantial and accidental form, namely, that of *subsidiary form*. A subsidiary form would inform a subsidiary whole – a holon. Such a form would stand part way between a truly substantial form, which informs an independently existing substance, and an accidental form, which inheres in another. Such would be the form of those organs that are wholes yet also parts (the heart, liver, eye, etc.), of the water molecules in the body, and of the DNA molecules in the cells. As the example of water shows, a form may function either as a substantial form or as a subsidiary form, depending on whether its composite, water, exists as an independent substance or as an inclusion in a more comprehensive form.
>
> Such subsidiary forms, and their correlative composites, would cover a vast range of entities, from elementary particles to parts of organisms and bodies. Depending on circumstances, they might operate both as holistic formal causes,

> serving to organize the constituents of a sub-whole like the heart, and as part-causes, which, like genes, affect a larger whole. There would be many degrees of subsidiarity: some subsidiary forms might be more independent of the larger whole than others, some less. Only empirical investigation of the many types of substances and systems can clarify the differing types and degrees of causality which we might find exercised by subsidiary forms.[24]

Perhaps we can set forth succinctly the essence of Nichols's position in the following syllogism: Every substance which contains subsidiary wholes (i.e., independent substances with their own characteristics which are parts of a larger substance) has a substantial form and many subsidiary forms (i.e., forms of subsidiary wholes). But every man is a substance which contains subsidiary wholes (i.e., independent substances with their own characteristics which are parts of a larger substance). Hence, every man has a substantial form and many subsidiary forms (i.e., forms of subsidiary wholes). From this syllogism it is apparent that, according to Nichols, St. Thomas's doctrine of substantial form is insufficient to account for the facts. In view of this, Nichols claims that the doctrine of substantial form needs to be helped or completed by the doctrine of subsidiary form.

## 5. Reply to Nichols's Doctrine of Subsidiary Form

In responding to Nichols's arguments, we shall proceed as we did above when we responded to Barnes's arguments. That is, we shall first address Nichols's proposed modification to St. Thomas's teaching on substantial form. Second, we shall attempt to deal with the three observations from modern science which appear to be inconsistent with what St. Thomas says about substantial

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[24] *Ibid.*, pp. 315-317. Not incidentally, Fr. Norris Clarke, S.J. agrees with Nichols's view regarding *holons* or "subsidiary wholes." See his, *The One and the Many: A Contemporary Thomistic Metaphysics* (South Bend, IN: University of Notre Dame Press, 2001), p. 102.

form.

Assuming that the syllogism which we just stated is a fair articulation of Nichols's position, let us begin by addressing it. We deny as false both the major and the minor premises of this syllogism; the major because it posits as true something which is impossible and the minor because it contradicts something which we manifested to be true in chapter four.

The major premise of this syllogism must be false since it maintains that there can be such a thing as a "subsidiary form." Above, Nichols defined the meaning of the name "subsidiary form" in this way: "such a form would stand part way between a truly substantial form, which informs an independently existing substance, and an accidental form, which inheres in another." Now regarding something that would stand between a substantial form and an accidental form, or which would be in a subject itself somehow stands between substance and accident, St. Thomas has this to say:

> ...it is altogether impossible for there to be something midway between substance and accident. For, then, something would be midway between affirmation and negation. For it is proper to accident to be in a subject, but to substance not to be in a subject. Indeed, substantial forms are in matter, but not in a subject. For a subject is a this something, while substantial form is what causes this something [to be] and does not presuppose it.[25]

As St. Thomas makes clear in this text, to maintain that something can stand midway between substance and accident is to maintain that something can stand midway between being in a subject and not being in a subject. But nothing can so stand. Hence, it follows that there is no possible subject for what Nichols calls "subsidiary form." But if this is true, then there can be no such thing

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[25] ...esse aliquid medium inter substantiam et accidens est omnino impossibile: esset enim aliquid medium inter affirmationem et negationem. Proprium enim accidentis est in subiecto esse, substantie uero in subiecto non esse; forme autem substantiales sunt quidem in materia, non autem in subiecto: nam subiectum est hoc aliquid; forma autem substantialis est que facit hoc aliquid, non autem presupponit ipsum. *De mixtione*, vol. 43, p. 156, lines 75-84.

as a "subsidiary form." As a consequence, Nichols's major premise is false since it posits that something which is impossible can be.

Now the minor premise of the above stated syllogism is false as well, but for a different reason. That is, the minor premise necessarily implies that no man is one substance. For, if the water in a man's cells and blood is an independent substance with its own characteristics (or many independent substances with their own characteristics), and if many of a man's organs are independent substances with their own characteristics, and if all of the genes which a man receives from his parents are independent substances with their own characteristics, then a man is finally just an aggregate of many independent substances with their own characteristics, and, hence, no man is one substance.

Nor, on Nichols's view, does man cease to be an aggregate of substances, if one adds the qualification that these independent substances with their own characteristics are also parts of man. For in what sense are these "parts" of man? They cannot truly be parts of his substance, since they are themselves independent substances. Rather, such parts can only be parts of a whole which is itself an aggregate of substances.

In chapter four, however, we showed that the statement, "no man is one substance," is false insofar as we manifested that we know that every man is indeed one natural substance. As a result, it is clear that Nichols must be wrong in maintaining that every man is a substance which contains subsidiary wholes.[26] However, it is not yet clear how the three observations which Nichols set forth

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[26] Perhaps the fact that substantial becoming is necessarily involved in all three cases mentioned above would have been clearer to Nichols had he not relied exclusively on external experience in order to make his judgements. In other words, had Nichols judged from external experience coupled with his internal experience of being an undivided natural substance, he would have seen more readily that in each of these three cases we must posit a veritable substantial change.

are compatible with St. Thomas's teachings on substantial form.

Our task here, then, is to answer the following question: How are the three observations described by Nichols compatible with St. Thomas's teachings on substantial form? Or, to put this same question more specifically, we can ask it this way: How can St. Thomas's doctrine of substantial form be reconciled with (1) the apparent existence of water and other lower natural substances in the various parts of a man, (2) the possibility of organ transplants and similar phenomena, and (3) the fact that various characteristics of a man are causally determined by the genetic materials which he receives from his parents?

Now before beginning to address the three parts of this question we should note two points. First, our answers to this tripartite question will of necessity be general in nature. As such, these answers will attempt to point out the direction in which one would proceed, if he were inclined to address these matters in all of their concretion and detail. Second, in answering the three parts of this question, we shall first address the second part, and then answer the first part, and lastly answer the third part. In this way our answers will be ordered based on the amount of required development (proceeding from least to greatest) of what we have established heretofore regarding St. Thomas's teachings on substantial form.

### 6. Reply to Nichols's Second Observation from Modern Science

Let us begin, then, by showing how the possibility of organ transplants and related phenomena can be reconciled with St. Thomas's doctrine on substantial form. Nichols maintained above that, from the fact that many of man's organs manifest a kind of life and operation that is their own once they have been removed from his body, it follows that these same organs must be

independent substances with their own characteristics prior to their removal from man's body.

This, however, is no necessary inference. For if, with the proper tools, it is possible to derive an oak rocking chair from an oak tree, it does not follow that there was an actually existing oak rocking chair in the oak tree prior to its removal therefrom. For the rocking chair may have been in the tree only in ability, and not in act. Moreover, if a man can claim to know that the oak tree is an undivided substance, then he can also claim to know that the rocking chair must have been in the oak tree only in ability, and not in act, prior to its removal therefrom. But, as we argued in chapter four, we do have grounds to say that we know that an oak tree is an undivided substance. Hence, we can also claim to know that the rocking chair must have been in the oak tree only in ability, and not in act, prior to its removal therefrom.

Now this reasoning applies *a fortiori* to the case at hand. That is, if, after removal, the heart is an independent substance with its own characteristics, it does not follow that, prior to its removal, the heart was an independent substance with its own characteristics. For, prior to its removal, the heart may have been one in its substantial being with its owner and, hence, may not have been an independent substance in act with its own characteristics, but rather, may have been such a substance only in ability. But it was made clear in chapter four that we know that every man is an undivided substance. Hence, we can claim to know that, prior to its removal, the heart is in fact one in its substantial being with its owner and, hence, is not at that time an independent substance in act with its own characteristics, but rather, it is such a substance only in ability.[27]

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[27] John Goyette helps this point along with the following words: "Modern medicine has shown that many, if not most, of the parts of the body can be kept alive after the death of the organism and can even retain their various functions. During heart-transplant surgery, the heart is removed from the body of the donor and placed in an oxygen-rich solution that enables it to carry on metabolic functions. The heart is even able to beat on its own outside the body. But if the heart and other organs of the body can be kept alive after the departure of the soul, this suggests that the soul is not the cause of the being of the heart. The solution to this difficulty is, I believe, relatively simple:

From this, then, we see that the possibility of organ transplants and related phenomena in no way requires us to posit any additional sort of form in man over and above the one substantial form which we have shown him to have. In addition to this, it might be worth noting that St. Thomas's doctrine on incomplete or intermediate substantial forms may help us to understand this matter more fully.[28] That is, since the heart and man's other organs are one in their substantial being with him, they have the same substantial form which he, the man, has. Thus, when the heart or some other organ is separated from a man, it thereby becomes its own substance and, therefore, acquires its own substantial form. But what kind of substantial form does it acquire? Since the substance in question (i.e., the separated heart or other separated organ) is not a "this something" in the fullest sense of the term, for it is not something complete in the nature of some species, the substance in question cannot have a complete substantial from. Hence, it must have an incomplete or intermediate substantial form.

And if this is true, then perhaps there was some partial truth contained in Nichols's notion of "subsidiary form." For although incomplete or intermediate substantial forms are truly substantial forms, and not accidental forms or something in between substantial forms and accidental forms, nonetheless, incomplete or intermediate substantial forms in some way fall away from the perfection

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the organs of the body need to be kept alive. Since the body begins to corrupt almost immediately after the departure of the soul, the organs of the body only retain their ability to function if they are artificially sustained. Indeed, even after an organ has been transplanted into the body of the recipient, it is able to stay alive and perform its function only with the help of drugs that suppress the immune system of the recipient which tends to reject the transplanted organ as a foreign body. Thus, the success of organ transplants does not undermine the principle that the being of the parts of a living body are caused by an intrinsic principle, namely, the soul, since transplanted organs are only able to stay alive by means of artificial interventions that aim to slow down the process of corruption and decay." See, John Goyette, "Substantial Form and the Recovery of an Aristotelian Natural Science," *The Thomist* 66 (2002), pp. 529-530.

[28] This doctrine was set forth briefly in chapter seven.

that complete substantial forms have. For, as we saw in chapter seven, an incomplete substantial form is that by which a substance is a subsistent thing, but it is not that by which a substance is a subsistent thing complete in the nature of some species. Moreover, there is even a sense in which these incomplete or intermediate substantial forms are present in a man who is a complete whole. That is, since man's substantial form contains in its power not only a sentient soul and a nutritive soul, but also all lower substantial forms (as the pentagon contains within itself the perfections of the quadrilateral and the triangle), as was shown in chapter seven, it follows that man's substantial form contains in its power all of the incomplete or intermediate substantial forms which any of his parts can come to have once they are separated from him. Thus, even such incomplete or intermediate substantial forms as are found in separated skin cells or separated blood are contained in the power of man's single substantial form.

### 7. Reply to Nichols's First Observation from Modern Science

Turning now to the first observation that Nichols makes, we must show how St. Thomas's doctrine of substantial form is compatible with the apparent existence of water and other lower natural substances in the various parts of a man. In order to do this, we shall appeal to St. Thomas's teaching on the way in which an element is present by its power in a mixed body, a teaching which Nichols too quickly dismisses. In so doing, we shall also attempt to show that the fundamental assumption which Nichols makes, namely, that only water existing in act can have the properties of water (e.g., the ability to dissolve salt),[29] is false and, thus, that his argument fails.

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[29] It isn't clear from Nichols's text how he knows that some parts of a man's blood and cells have some of the properties of water. Does he known this through direct observation, or through resolving blood and cells which have been removed from a man into their various components (one of which would be water), or does he know this

To begin, St. Thomas takes it as known that certain combinations of the elements always result in some new homogeneous substance, commonly called "a mixed body," which both retains something of the properties of the elements from which it comes to be and is resolvable into those same elements. Now since the mixed body both retains something of the properties of the elements from which it comes to be and is resolvable into those same elements, St. Thomas takes it as evident that the elements and their substantial forms do not entirely cease to be when the mixed body comes to be. Rather, the elements and their substantial forms in some way remain in the newly produced mixed body. Thus, we are led to wonder about the precise way in which they do remain.

Now fundamentally there are only two options. Either the elements and their substantial forms remain in the mixed body in act, or they remain in it in ability. St. Thomas is wont to explicate the views of Avicenna and Averroes as representative of those positions which would affirm that the elements and their substantial forms remain in the mixed body in act. In the *Prima pars* St. Thomas both sets forth and refutes these positions as follows:

> Avicenna posited that the substantial forms of the elements entirely remain in the mixture and that the mixture comes to be insofar as the contrary qualities of the elements are reduced to a mean. But this is impossible. For different forms of the elements can only be in different parts of matter. Now in order to have different parts it is necessary to understand dimensions, since without these matter cannot be divisible. But matter is not subject to dimensions except in a body. But different bodies cannot be in the same place. Hence, it follows that the elements would be in distinct locations in the mixture. And, thus, it would not be a true mixture according to the whole, but rather a mixture according to sense with the smallest parts placed next to each other.
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> Averroes posited in the third book of *De caelo* that, on account of their imperfection, the forms of the elements are in between accidental and substantial

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through some other means? For the sake of addressing his argument, we shall assume that he knows this through direct observation (which is the stronger reading of his argument). For if he only knows this through resolution, then we could show that he is again guilty of the same *non sequitur* which befell him above. Indeed, he would have proved once more that there are rocking chairs actually present in oak trees.

> forms and, therefore, admit of more and less. Thus, these forms are lessened in the mixture and reduced to a mean and, as a result, one form is produced from them. But this is even more impossible [i.e., than Avicenna's position]. For the substantial existence of each thing consists in something indivisible and every addition and subtraction causes a change in species, as in numbers, as is said in the eighth book of the *Metaphysics*. Whence, it is impossible that any substantial form admit of more and less. Nor is it less impossible that there be something in between substance and accident.[30]

What is noteworthy about this text is that it seems to show that if one maintains that the elements and their substantial forms remain in the mixed body in act, then one must finally deny either that the mixed body is a substance or that the substantial forms of the elements are in fact substantial forms. In other words, to hold that the elements and their substantial forms remain in the mixed body in act finally requires one to side either with Avicenna or with Averroes.

Now since it has just been shown that the elements and their substantial forms cannot remain in the mixed body in act, they must, therefore, remain in it in ability. Given this, St. Thomas goes on to specify the precise way in which they remain in ability. He states:

> And, therefore, it must be said, according to the Philosopher in the first book in *On Generation and Corruption*, that the forms of the elements remain in the mixture, not in act, but by their power. For the proper qualities of the elements (in which the power of the elementary forms are) remain, although they have been lessened. And this sort of quality of the mixture is the proper disposition for the

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[30] Avicenna posuit formas substantiales elementorum integras remanere in mixto, mixtionem autem fieri secundum quod contrariae qualitates elementorum reducuntur ad medium. Sed hoc est impossibile. Quia diversae formae elementorum non possunt esse nisi in diversis partibus materiae; ad quarum diversitatem oportet intelligi dimensiones, sine quibus materia divisibilis esse non potest. Materia autem dimensioni subiecta non invenitur nisi in corpore. Diversa autem corpora non possunt esse in eodem loco. Unde sequitur quod elementa sint in mixto distincta secundum situm. Et ita non erit vera mixtio, quae est secundum totum, sed mixtio ad sensum, quae est secundum minima iuxta se posita.

Averroes autem posuit, in III de caelo, quod formae elementorum, propter sui imperfectionem, sunt mediae inter formas accidentales et substantiales; et ideo recipiunt magis et minus; et ideo remittuntur in mixtione et ad medium reducuntur, et conflatur ex eis una forma. Sed hoc est etiam magis impossibile. Nam esse substantiale cuiuslibet rei in indivisibili consistit; et omnis additio et subtractio variat speciem, sicut in numeris, ut dicitur in VIII Metaphys. Unde impossibile est quod forma substantialis quaecumque recipiat magis et minus. Nec minus est impossibile aliquid esse medium inter substantiam et accidens. *ST* I, q. 76, a. 4 *ad 4um*, vol. 5, p. 224.

substantial form of the mixed body, such as the form of a stone or any soul.[31]

Providing us with a further explication of St. Thomas's position, Christopher Decaen states:

> ...Thomas's answer to the question of how the elements exist in a mixed substance is that they exist by their powers existing, and this means that their substantial forms in and of themselves do not exist in actuality, and in fact neither do their active and passive qualities, at least not to their full "excellence." Speaking most properly, both are preserved only *in potentia*, although I add that the preservation of the elemental powers is both more evident and less potential than that of the elemental substantial forms. For...not only is the presence of the elemental qualities evident to sense – unlike that of the elemental substantial forms in the mixture – but the substantial forms are there only *virtute*, that is, only by means of their powers. We know the former are preserved because we know the latter are preserved, although technically both are preserved only potentially, the elemental substantial form because there can be only one actual substantial form of one substance, and the elemental powers because opposed qualities cannot exist in one (homogeneous) subject at the same time.[32]

Hence, from what has been said, we can see that St. Thomas's account of the way in which the elements and their substantial forms remain in a mixed body is the only account which comports with these three things: (1) the fact that the elements and their substantial forms are not totally corrupted when the mixed body comes to be, but in some way remain in it, (2) the understanding that the mixed body is a substance (as opposed to an aggregate of elements) and (3) the fact that the substantial forms of the elements are genuine substantial forms (as opposed to some kind of form in between accidental and substantial forms).

Albeit that St. Thomas's teaching on presence by power is often set within the context of the

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[31] Et ideo dicendum est, secundum philosophum in I de Generat., quod formae elementorum manent in mixto non actu, sed virtute. Manent enim qualitates propriae elementorum, licet remissae, in quibus est virtus formarum elementarium. Et huiusmodi qualitas mixtionis est propria dispositio ad formam substantialem corporis mixti, puta formam lapidis, vel animae cuiuscumque. *ST* I, q. 76, a. 4 *ad* 4*um*, vol. 5, p. 224.

[32] Christopher Decaen, "Elemental Virtual Presence in St. Thomas," *The Thomist* 64 (2000), pp. 293-294.

way in which the elements and their substantial forms are present in homogeneous mixed bodies, it is not difficult to see that this doctrine can be extended to the way in which certain lower substances and their substantial forms are present in various higher heterogeneous substances. In other words, if we see that a higher substance with many different kinds of parts (e.g., a man) comes to be from many different kinds of lower substances (e.g., water *et alii huiusmodi*) in such a way that some of their properties remain in the higher substance (e.g., the ability to dissolve salt) and such that the higher substance is resolvable into them, then we must maintain that these lower substances (e.g., water *et alii huiusmodi*) and their substantial forms are present by their powers in the higher substance which has come to be from them. But we do in fact see that a higher substance with many different kinds of parts (i.e., a man) comes to be from many different kinds of lower substances (i.e., water *et alii huiusmodi*) in such a way that some of their properties remain in the higher substance (i.e., the ability to dissolve salt) and such that the higher substance is resolvable into them. Hence, *contra* Nichols, we must maintain that these lower substances (i.e., water *et alii huiusmodi*) and their substantial forms are present by their powers in the higher substance (i.e., a man) which has come to be from them.

Furthermore, given what was established above, if one claims that these lower substances and their substantial forms remain in act in the higher heterogeneous substance, then one would have to deny either that the higher heterogenous substance is in fact one substance[33] or that the substantial

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[33] It does seem worthwhile to ask ourselves this question: When can we claim to know with certitude that what we have before us is a genuine heterogeneous substance and not just a heterogeneous substance *ad sensum* (which, in truth, would be nothing more than an aggregate of many different kinds of substances)? Asking this question should cause us to think back to what was established in chapter four. Beginning to answer this question (which we shall not try to resolve fully here), Fr. Peter Hoenen, S. J. writes: "Dicimus...nos heterogeneitatem non esse signum actuationis partium in linea substantiae, aliis verbis extensum posse esse unum actu quoad substantiam et multiplex actu secundum accidentia, etiam si haec inhaereant in diversis partibus entis extensi.... Haec veritas videtur esse valde clara. Certum enim est ex ipsa experientia interna nos simul velle et intelligere; ecce nobis conscii

forms of the lower substances are genuine substantial forms. It is worth noting here that Nichols has denied both of these truths. For, as was pointed out above, insofar as he claims that independent substances with their own characteristics are parts of man's substance, Nichols necessarily implies that man is an aggregate of substances rather than one substance. Furthermore, insofar as he says that the water which is present in a man's blood and cells is a subsidiary whole with a subsidiary form, he denies that this water has a genuine substantial form. On the contrary, its form "stand[s] part way between a truly substantial form, which informs an independently existing substance, and an accidental form, which inheres in another," as Nichols claims. Hence, in a way, Nichols's position contains the difficulties of both Avicenna and Averroes's views.

From what has been said, then, it should be clear that St. Thomas's account of the way in which lower substances and their substantial forms remain in a higher heterogeneous substance is the only account which comports with these three things: (1) the fact that the lower substances and their substantial forms are not totally corrupted when the higher heterogenous substance comes to be, but in some way remain in it, (2) the fact that the heterogeneous substance is one substance (as opposed to an aggregate of lower substances) and (3) the fact that the substantial forms of the lower substances are genuine substantial forms (as opposed to some kind of form in between accidental and substantial forms).

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sumus unitatis subiecti (substantiae) et multiplicitatis actualis accidentium. In hoc quidem casu illa accidentia non sunt in diversis partibus integrantibus, sed hoc quoque verificatum habemus ex experientia interna; nam etiam nobis conscii sumus nos simul videre et audire et sentire in variis partibus unius nostri corporis; insuper in diversis eiusdem corporis partibus observamus alias et alias qualitates, permanentes quoque, inter quas tales quae aeque abrupte variantur ac in corporibus anorganicis. Clarum est admittendum esse in quod S. Thomas formula praegnante, sine ulla restrictione, exprimit (*S. Th.* I q. 11, a. 1 ad 2): aliquid potest esse 'unum subiecto et multa secundum accidentia.' De facto igitur observamus heterogeneitatem pure accidentalem. Inde: heterogeneitas per se *non* solvit continuitatem." *Cosmologia* (Rome, Italy: Gregorian University Press, 1949), pp. 18-19. See also, Warren Murray, "If T'Were a Substance," pp. 188ff.

Thus, rather than posing a difficulty for St. Thomas's teaching on substantial form, the apparent existence of water and other lower natural substances in the various parts of a man is perfectly consistent with it. After all, it is St. Thomas himself who states:

> ...it must be said that no other substantial form is in man other than the intellectual soul, and that this soul contains by its power all inferior forms, just as it contains by its power the sensitive and nutritive souls, and that it alone makes whatever the more imperfect forms make in other things. And something similar must be said concerning the sensitive soul in brutes and the nutritive soul in plants, and universally concerning more perfect forms with respect to more imperfect ones.[34]

## 8. Reply to Nichols's Third Objection from Modern Science

Lastly, in order to address Nichols's third and final observation, we need to show that St. Thomas's doctrine on substantial form is compatible with the fact that various characteristics of a man are causally determined by the genetic materials which he receives from his parents. To begin, let us see what St. Thomas teaches regarding the characteristics which a man receives from his parents. In the *De malo* he maintains:

> ...it must be noted that a univocal generator communicates the nature of his species to one generated, and consequently all of the accidents which follow from the species. For just as a man begets a man, so a risible thing begets a risible thing. Now if the power of the generator be strong, he passes on his likeness to the one generated even as regards individual accidents. But this is true regarding accidents which in some way belong to the body, and not regarding accidents which pertain only to the soul, especially the intellectual soul, which is not a power in a bodily organ. For a white man for the most part begets a white son, a large man a large son, but a

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[34] Unde dicendum est quod nulla alia forma substantialis est in homine, nisi sola anima intellectiva; et quod ipsa, sicut virtute continet animam sensitivam et nutritivam, ita virtute continet omnes inferiores formas, et facit ipsa sola quidquid imperfectiores formae in aliis faciunt. Et similiter est dicendum de anima sensitiva in brutis, et de nutritiva in plantis, et universaliter de omnibus formis perfectioribus respectu imperfectiorum. *ST* I, q. 76, a. 4, vol. 5, p. 224.

grammarian never begets a grammarian, or a natural scientist a natural scientist.[35]

Similarly, in the *Prima secundae*, St. Thomas writes:

> ...a man generates the same as himself in species, but not according to the individual. And, therefore, those things that pertain to the individual, such as personal acts and those things which belong to them, are not passed on from parents to their children. For a grammarian does not pass on to his son the science of grammar, which he acquired through his own study. But those things which belong to the nature of the species are passed on from parents to their children, unless there be a defect of nature. Just as a man having eyes begets a son with eyes unless nature fails. And if the nature be strong, even some individual accidents belonging to the disposition of nature are propagated in the children, as quickness of body, keenness of mind, and other things of this sort. But in no way are those things propagated which are purely personal, as was said.[36]

These texts affirm two things and deny one thing. First, they affirm that, in generating his child, a father passes on to him both his species and the accidents proper to that species. Second, they affirm that "if the power of the generator be strong," the father also passes on to his child various inseparable accidents such as color, body type, quickness of body, and keenness of mind. And these texts deny that a father passes on to his child those things which are purely personal or which pertain only to his (i.e., the father's) soul such as the art of grammar or the science of nature.

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[35] Ad cuius evidentiam attendendum est, quod generans univocum naturam suae speciei communicat generato, et per consequens omnia accidentia quae speciem consequuntur; sicut enim homo generat hominem, ita risibilis risibilem. Si autem virtus generantis sit fortis, tradit in genito similitudinem suam etiam quantum ad accidentia individualia. Sed hoc verum est de accidentibus quae aliqualiter ad corpus pertinent, non autem de accidentibus quae solum pertinent ad animam, maxime intellectivam, quae non est virtus in organo corporali: homo enim albus plerumque generat filium album et magnus magnum; nunquam autem grammaticus grammaticum, aut physicus physicum. *De malo*, q. 4, a. 8, vol. 23, p. 127 .

[36] ...homo generat sibi idem in specie, non autem secundum individuum. Et ideo ea quae directe pertinent ad individuum, sicut personales actus et quae ad eos pertinent, non traducuntur a parentibus in filios, non enim grammaticus traducit in filium scientiam grammaticae, quam proprio studio acquisivit. Sed ea quae pertinent ad naturam speciei, traducuntur a parentibus in filios, nisi sit defectus naturae, sicut oculatus generat oculatum, nisi natura deficiat. Et si natura sit fortis, etiam aliqua accidentia individualia propagantur in filios, pertinentia ad dispositionem naturae, sicut velocitas corporis, bonitas ingenii, et alia huiusmodi, nullo autem modo ea quae sunt pure personalia, ut dictum est. *ST* I-II, q. 81, a. 2, vol. 7, p. 89.

How, though, according to St. Thomas, does a father pass on to his child these aforementioned things? The essence of St. Thomas's answer seems to be this: the father passes these things on to his child by giving a certain configuration to the matter from which his child comes to be.[37] More specifically, it is through the instrumentality of his sperm that the father configures in a particular way the reproductive materials which both he and the child's mother supply.[38] And this act of configuring the reproductive materials continues until these materials have the configuration or the dispositions and organization proper to the body of a human child and, thus, require the presence of the rational soul.[39]

Now it is essential to see here that while there is a certain configuration of the reproductive

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[37] The following text from *SCG*, Bk. 2, ch. 89 *ad* 10*um*, vol. 13, p. 543 is quite instructive here: "...corpus animae configurari, et ob hoc animam sibi corpus simile praeparare: partim quidem est verum, partim autem falsum. Si enim intelligatur de anima generantis, est verum quod dicitur: falsum autem si intelligatur de anima generati. Non enim virtute animae generati formatur corpus quantum ad primas et praecipuas partes, sed virtute animae generantis, ut supra probatum est. Similiter enim et omnis materia suae formae configuratur: non tamen haec configuratio fit ex actione generati, sed ex actione formae generantis." See also, *SCG*, Bk. 2, ch. 89 *ad* 6*um*, vol. 13, p. 543: "Etsi enim detur quod corpus hominis formetur prius quam anima creetur, aut e converso, non sequitur quod idem homo sit prior seipso: non enim homo est suum corpus, neque sua anima. Sequitur autem quod aliqua pars eius sit altera prior. Quod non est inconveniens: nam materia tempore est prior forma; materiam dico secundum quod est in potentia ad formam, non secundum quod actu est per formam perfecta, sic enim est simul cum forma. Corpus igitur humanum, secundum quod est in potentia ad animam, utpote cum nondum habet animam, est prius tempore quam anima: tunc autem non est humanum actu, sed potentia tantum. Cum vero est humanum actu, quasi per animam humanam perfectum, non est prius neque posterius anima, sed simul cum ea."

[38] For some of the details of St. Thomas's view on this matter, see *SCG*, Bk. 2, ch. 89, vol. 13, pp. 540-543, *ST* I, q. 118, a. 1 *ad* 4*um*, vol. 5, p. 564, and *DPN*, ch. 1, vol. 43, p. 39.

[39] See pages 365-366 above. The following text also helps to elucidate this matter: "Disponens autem quod non inducit ultimam formam perfectivam, sed tantummodo praeparat materiam ad formam; sicut ille, qui dolat ligna et lapides, dicitur domum facere. Et haec non proprie dicitur efficiens domus; quia id, quod ipse facit, non est domus nisi in potentiam. Magis tamen proprie erit efficiens, si inducat ultimam dispositionem ad quam sequitur de necessitate forma; sicut homo generat hominem non causans intellectum, qui est ab extrinseco. *In Metaphys.*, Bk. 5, *lectio* 2, p. 255 (#767).

Regarding the act of configuring the matter from which a living being will come to be, Charles DeKoninck states: "...if we understand in generation not only the instantaneous act in which a new composite is generated, but also the dispositive preparation by way of alteration, we must see in it a veritable *factio* in which the generated is modeled, a formation parceled out in time. A living being is under construction before it exists." From, *The Writings of Charles De Koninck*, p. 281.

materials which must be if a man is to come to be from them, the particular configuration of the reproductive materials from which one man comes to be may in many ways either be the same or different from the particular configuration of the reproductive materials from which another man comes to be.[40] For example, it is because Mr. Smith and baby Smith's reproductive materials had the same particular configuration that they are both of brownish complexion and quick of body. And it is owing to the fact that Mr. Smith and Mrs. Smith's reproductive materials had different particular configurations that the former is male and the latter female.[41]

Connected with this, it is important to see that both St. Thomas and Cajetan maintain that the particular configuration of the matter from which the child comes to be in some way determines the rational soul which he receives. Regarding this, Cajetan states:

> Just as the soul in general is fitted to an organized natural body, etc., so the human soul is fitted to a body which has been reduced to an equality of tangible qualities. Hence, it is necessary that this soul be substantially fitted to and commensurated to

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[40] St. Thomas makes a similar point regarding the "natural disposition" which belongs to man. He writes: "Est enim aliqua dispositio naturalis quae debetur speciei, extra quam nullus homo invenitur. Et haec est naturalis secundum naturam speciei. Sed quia talis dispositio quandam latitudinem habet, contingit diversos gradus huiusmodi dispositionis convenire diversis hominibus secundum naturam individui." *ST* I-II, q. 51, a. 1, vol. 6, p. 325.

[41] What Cajetan has to say about the way in which both skin color and gender are determined is of relevance here. He writes: "Accidentium sequentium materiam quaedam sequuntur eam in ordine ad formam generalem, quaedam in ordine ad formam specialem. Illa accidentia dicuntur sequi materiam in ordine ad formam generalem, quae individuo generis altioris conveniunt ratione magis suae materiae quam formam: sicut hoc mixtum habet cutis nigredinem non ex ratione formae mixti, sed quia materia sua talis passa est, puta in tali climate, ubi calor solis abundat. Illa vero dicuntur et consequi materiam in ordine ad formam specialem, quae individuo inferioris generis vel speciei conveniunt magis ratione materiae quam formae: sicut hoc animal est masculinum non ratione animae principaliter, sed quia materiam ad animam dispositam talis passio comitata est: puta quia materia plene dominio actus vigorosi seminis subjecta non fuit." *Commentaria in De ente et essentia*, c. 7.

St. Thomas's account of the latter is also of interest here. He writes: "...masculus et femina sunt proprie passiones animalis, quia animal ponitur in definitione utriusque. Sed non conveniunt animali secundum substantiam et formam, sed ex parte materiae et corporis. Quod patet ex hoc, quod idem sperma potest fieri masculus et femina, secundum quod diversimodi patitur aliquam passionem; quia cum fuerit calor operans fortis, fiet masculus; cum autem erit debilis, fiet femina. Hoc autem non posset esse vel contingere si masculus et femina different specie. Non enim ex uno semine diversa secundum speciem producuntur. Quia in semine vis est activa, et omne agens naturale agit ad determinatam speciem, quia agit sibi simile. Unde relinquitur quod masculus et femina non differant secundum formam nec sunt diversa secundum speciem. *In Metaphys.*, Bk. 10, *lectio* 11, p. 606 (#2134).

> a body that has been reduced to such a level of tangible qualities. For the equality of the constitution required by the human body does not consist in something indivisible, as is clear from sense experience. For some men excel others in the quality of their sense of touch. And since the human soul is not caused by the body, but depends on it only for its coming to be, not as a cause, but as an occasion, it follows that, when the soul comes to be, it receives a substantial commensuration to the body thusly constituted, as it is found to be in that beginning. And it is necessary that it always retain that substantial commensuration, since it is an unchangeable substance.[42]

Here Cajetan is saying that when a soul is first received into a particular body with a particular configuration, it is once and for all fitted to it.[43] Moreover, the commensuration which the soul

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[42] Quemadmodum enim anima in communi est coaptata corpori organico physico etc., et anima humana corpori reducto ad aequalitatem tangibilium; ita oportet hanc animam esse substantialiter coaptatam et commensuratam corpori ad talem gradum aequalitatis reducto. Non enim consistit in indivisibili aequalitas complexionis requisita ad corpus humanum, ut patet ad sensum: alii enim aliis praestant bonitate tactus. Et quia anima humana non causatur ex corpore, sed in suo tantum fieri dependet ex corpore non ut causa, sed ut occasione; consequens est quod anima haec, cum fit, sortiatur commensurationem substantialem ad corpus sic complexionatum ut invenitur in illo initio; et eam semper retineat necesse est, quia intransmutabilis substantiae est. *Commentaria in Summa Theologiae* on *ST* I, q. 85, a. 7, vol. 5, p. 345.

[43] This is clearly the position of St. Thomas as well. In *SCG*, Bk. 2, ch. 81, vol. 13, p. 505 he holds the following: "Non enim quaelibet formarum diversitas facit diversitatem secundum speciem, sed solum illa quae est secundum principia formalia, vel secundum diversam rationem formae: constat enim quod alia est essentia formae huius ignis et illius, nec tamen est alius ignis neque alia forma secundum speciem. Multitudo igitur animarum a corporibus separatarum consequitur quidem diversitatem formarum secundum substantiam, quia alia est substantia huius animae et illius: non tamen ista diversitas procedit ex diversitate principiorum essentialium ipsius animae, nec est secundum diversam rationem animae; sed est secundum diversam commensurationem animarum ad corpora; haec enim anima est commensurata huic corpori et non illi, illa autem alii, et sic de omnibus. Huiusmodi autem commensurationes remanent in animabus etiam pereuntibus corporibus: sicut et ipsae earum substantiae manent, quasi a corporibus secundum esse non dependentes. Sunt enim animae secundum substantias suas formae corporum: alias accidentaliter corpori unirentur, et sic ex anima et corpore non fieret unum per se, sed unum per accidens. Inquantum autem formae sunt, oportet eas esse corporibus commensuratas. Unde patet quod ipsae diversae commensurationes manent in animabus separatis: et per consequens pluralitas." See also, *In Sent.*, Bk. 1, d. 8, q. 5, a. 2 *ad 6um*, vol. 1, pp. 231-232 and *ST* I, q. 7, a. 1, vol. 4, p. 72.

This teaching regarding the differences in commensurations had by different rational souls can help us to see why St. Edith Stein says the following: "Only the person blinded by the passion of controversy could deny that woman in soul and body is formed for a particular purpose. The clear and irrevocable word of Scripture declares what daily experience teaches from the beginning of the world: woman is destined to be wife and mother. Both physically and spiritually she is endowed for this purpose, as is seen clearly from practical experience. However, it follows also from the Thomistic principle of *anima forma corporis* that such a spiritual characteristic does exist. Of course, woman shares a basic human nature, but basically her faculties are different from men; therefore, a differing type of soul must exist as well." From St. Edith Stein, *Essays on Woman*, Freda Mary Oben, trans. (ICS Publications: Washington, D.C., 1996), p. 45. I interpret this text to mean that since the commensuration of the soul is determined by the body to which it is fitted, and since the bodies of women differ from those of men, the souls of women will consequently have a different sort of commensuration than will the souls of men. Thus, we can

receives is substantial in the sense that it is something which belongs to the soul's very substance. This is necessary for just as the soul, taken generally, is, in terms of its substance, the act of a certain kind of body, so too every particular soul, taken as such, is, in terms of its substance, the act of this or that body of a certain kind. In keeping with this, Cajetan holds that "the commensuration of this soul to this body is an individual difference contracting the soul to this body and it is intrinsic to this soul, just as a specific difference is intrinsic to the species."[44]

Agreeing with Cajetan's general account, St. Thomas goes so far as to maintain that the better the particular configuration of a man's body, the better or more noble is the rational soul which he receives. Concerning this, St. Thomas holds:

> ...since all rational souls are of one species, they differ only in number. But every such difference is caused by matter. And, therefore, since the soul does not have matter as one of its parts, it is necessary that the difference and distinction in level in souls be caused by a difference in body; so that insofar as a body is better constituted, it gives rise to a more noble soul, since everything which is received in another is received through the mode of the receiver. And this indeed is clear from two signs. First, from those things which are of different genera. For each thing is found to share in a more noble kind of soul to the extent that its body attains to a more noble kind of constitution, as in men, brutes, and plants. Whence, even in those things which are of one kind, the difference in souls happens from this, that there is a difference in bodies. And this is clear from the sign of a good intellect, which the Philosopher gives us to understand in the second book of *On the Soul*, where he says that those who have a better sense of touch and softer skin have keener minds. But a good sense of touch arises from an equality of constitution, since it is necessary that

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intelligibly say that men and women have different "types" of souls.

I'm not sure that this reading of St. Edith Stein's text fits with Oben's reading. She writes: "Manifesting brilliant reflection, she [i.e., St. Edith] inferred from a formulated truth of St. Thomas, *anima forma corporis*" (the soul is the formative principle of the body), that inasmuch as the feminine body is a feminine body, this feminine body must also correspond to a feminine soul just as the masculine body must correspond to a masculine soul" (*Ibid.*, p. 21). Here Oben may be saying that men and women have different types of bodies because they have different types of souls. My reading, on the other hand, maintains that men and women can be said to have different types of souls insofar as they have different types of bodies which give rise to different types of commensurations in their souls.

[44] Commensuratio enim huius animae ad hoc corpus est individualis differentia contrahens animam ad hanc, et est intrinseca huic animae, sicut differentia specifica est intrinseca speciei. *Ibid.*, para. 6.

> the organ of touch be a mean between contrary tangibles. And insofar as it attains more to the mean, to that extent the sense of touch will be better. Hence, it is clear that the difference in souls results from a difference of body.[45]

This text is helpful to us, since, in giving examples of particular characteristics that a father can pass on to his son, St. Thomas not only mentions skin color, largeness of stature, and quickness of body, but also keenness of mind. And here we see why it can be said that a keen mind goes hand in hand with a particular configuration of the body which a child receives from his parents.[46] For, as St. Thomas states generally, "everything which is received in another is received through the mode of the receiver."

At this point, let us return to Nichols's third and final observation. Have we shown that St. Thomas's doctrine on substantial form is compatible with the fact that various characteristics of a man are causally determined by the genetic materials which he receives from his parents? It seems that we have, at least, implicitly. Yet, before we make this explicit, we should first make clear a certain deficiency in Nichols's understanding of what St. Thomas teaches regarding substantial

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[45] ...cum omnes animae rationales unius speciei sint, differunt autem numero solo. Omnis autem talis diversitas ex materia causatur; et ideo cum anima non habeat materiam partem sui, oportet quod diversitas et distinctio gradus in animabus causetur ex diversitate corporis; ut quanto corpus melius complexionatum fuerit, nobiliorem animam sortiatur: cum omne quod in aliquo recipitur, per modum recipientis sit receptum: et hoc quidem duplici signo patet. Primo ex his quae diversi generis sunt: quia unumquodque invenitur tanto nobilius genus animae participare, quanto corpus ejus ad nobilius genus complexionis pertingit, ut in hominibus, brutis, et plantis. Unde etiam in his quae sunt unius generis, ex hoc contingit diversitas animarum, quod est in corporibus diversitas: et hoc etiam patet ex signo boni intellectus, quod philosophus in 2 de anima dat intelligere, dicens, eos qui sunt boni tactus et molles carne, aptos mente esse. Bonitas autem tactus ex aequalitate complexionis contingit: quia oportet ut instrumentum tactus inter contraria tangibilia sit medium; et quanto magis pervenit ad medium, tanto melior erit tactus. Unde patet quod ex diversitate corporis animarum diversitas resultat. *In Sent.*, Bk. 2, d. 32, q. 2, a. 3, vol. 2, p. 839. Here perhaps the reply to the first objection is of some interest as well. St. Thomas writes: "...dicendum quod diversitas formalis est duplex. Quaedam quae est formae per se, secundum id quod ad rationem formae pertinet: et talis diversitas formae, diversitatem speciei inducit. Est autem quaedam diversitas formae non per se, sed per accidens, ex diversitate materiae resultans, secundum quod in materia melius disposita dignius forma participatur; et talis diversitas speciem non diversificat: et haec est diversitas animarum." *Ibid.*, pp. 839-840. See also, *ST* I, q. 85, a. 7, vol. 5, p. 344.

[46] See also, *ST* I, q. 85, a. 7, vol. 5, p. 344.

becoming. It will be recalled that, according to Nichols, St. Thomas's account of substantial form must be problematic since it implies that things such as human reproductive cells and the strands of DNA in them do not survive the substantial becoming wherein human reproductive cells become a man. Put more formally, it seems that Nichols's argument comes to this:

> No thing which fails to survive the substantial becoming whereby a man comes to be has an effect on the man at which the substantial becoming terminates.
> But, according to St. Thomas's understanding of the nature of substantial form, every human reproductive cell fails to survive the substantial becoming whereby a man comes to be.
> Hence, according to St. Thomas's understanding of the nature of substantial form, no human reproductive cell has an effect on the man at which the substantial becoming terminates.
> But human reproductive cells obviously do, in some way, have an effect on the man at which the substantial becoming terminates.
> Therefore, St. Thomas's understanding of the nature of substantial form is false.

In order to make clear the deficiency in Nichols's argument we must make a distinction. The distinction in question is between what survives a becoming *formally* and what survives a becoming *virtually*.[47] To exemplify this, we can say that when Mr. Smith becomes musical, Mr. Smith survives the becoming formally since the substance which we call "Mr. Smith" is still alive after the becoming. On the other hand, when Mr. Smith drinks water and the water becomes part of him, the water does not survive the becoming formally since the water no longer exists after the becoming. Nevertheless, since, as we saw above, some of the powers of the water which becomes part of Mr. Smith survive this substantial becoming, we can say that the water does survive the becoming virtually.

Now, given this distinction, we can see that the above mentioned syllogistic presentation of

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[47] Regarding this distinction, see, John of St. Thomas, *Cursus Philosophicus, Nat. Phil.*, p. 3, q. 1, a. 7, pp. 596-597.

Nichols's position actually contains two middle terms and, thus, is invalid. That is, the major premise (i.e., "No thing which fails to survive the substantial becoming whereby a man comes to be has an effect on the man at which the substantial becoming terminates") is true only if we understand the human reproductive cells to fail to survive the substantial becoming both formally and virtually. However, the minor premise (i.e., "But, according to St. Thomas's understanding of the nature of substantial form, every human reproductive cell fails to survive the substantial becoming whereby a man comes to be") is true only if we say that the reproductive cells fail to survive the becoming of a man formally, but do not fail to survive the becoming of a man virtually. For, in light of what has been established above, St. Thomas's position seems to be that what today we call "human reproductive cells" survive the substantial becoming of a man virtually, albeit not formally. As a result, it is clear that Nichols's objection against St. Thomas's understanding of the nature of substantial form misses its mark.

Now with these things in mind, we can quite readily see two ways in which the reality of genes may be incorporated into St. Thomas's account of substantial form and substantial becoming. First, granting for the sake of argument the truth of St. Thomas's view of the coming to be of a man,[48] we must maintain that although the human reproductive cells do not formally survive the

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[48] As is clear from texts that were cited above, St. Thomas thinks that the rational soul is not infused by God at the moment of conception, but at some later time after the matter has been duly disposed and organized. As far as I can tell, Catholic theologians are still permitted to hold to this sort of view. Regarding this, see: *Dignitatis Personae* or *Instructio de quibusdam scientiae bioëthicae quaestionibus*, September 8, 2008 *AAS* 100 (2008), pp. 858-887; *Donum Vitae* or *Instructio de observantia erga vitam humanam nascentem deque procreationis dignitate tuenda. Responsiones ad quasdam quaestiones nostris temporibus agitatas*, February 22, 1987 *AAS* 80 (1988), pp. 70-102; and *Declaratio de abortu procurato*, November 18, 1974 *AAS* 66 (1974), pp. 730-747. In terms of secondary literature see: Fr. Philip Smith, O.P., "Transient Natures at the Edges of Life," pp. 191-227; Rudolph Joseph Gerber, "When is the Human Soul Infused?," *Laval Theologique et Philosophique* 22 (1966), pp. 234-247; and Fr. Benedict Ashley, O.P. and Fr. Albert Moraczewski, O.P., "Is the Biological Subject of Human Rights Present from Conception?," in Peter Cataldo and Fr. Albert Moraczewski (eds.), *The Fetal Tissue Issue: Medical and Ethical Aspects* (Braintree, MS: The Pope John XXIII Medical-Ethics Research and Education Center, 1994), pp. 33-59. It is far beyond our intention here to enter into a discussion of this difficult philosophical issue.

substantial becoming whereby a man comes to be, they do survive it virtually. In other words, the human reproductive cells are present by their powers in the man who comes to be from them. Now amongst the powers of the human reproductive cells which survive this substantial becoming are those which scientists today call "genes." If this is so, then, on St. Thomas's account, "genes" must be understood generally to be nothing other than certain configurations of matter which are parts (and, perhaps, the chief parts) of the overall configuration of matter that constitutes the properly disposed and organized matter which is the proper subject of the rational soul. Furthermore, given what was established above, we can even say that the genes which a child receives from his parents are in some way determinative of the quality of substantial form or rational soul which he receives.

Second, once the genes which were present in the human reproductive cells are present in the man who has come to be, it is clear that they function in some way as tools belonging to the man. Making a closely related point, Joseph Bobik writes:

> To say that a mixed body could not be without a certain number of certain kinds of elements (and atoms and molecules) is to say that without their intervening dispositional presence, prime matter could not have acquired a given sort of substantial form (nor continue to possess it), and so the mixed body could not have come to be, nor continue to be, what it is. To say that the mixed body could not act without a certain number of kinds of elements (and atoms and molecules) is to say that it depends on their instrumental presence, i.e., that it needs the powers of the elements (and of the atoms and the molecules) as the means, the instruments, the instrumental agent causes, through which it performs its proper activities. Thus, elements (along with certain sorts of atoms and molecules) are not only material causes of a special sort, they are also agent causes of a special sort, i.e., instrumental agent causes.[49]

Along similar lines, we must hold that a man is a rational, sentient, living mixed body who depends on some of the powers of the reproductive cells from which he came to be, namely, his genes, in

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[49] Joseph Bobik, *Aquinas on Matter, Form, and the Elements*, *op. cit.*, 140-141.

order to do such things as grow, heal wounds, and so forth. Hence, we can maintain that genes "are not only material causes of a special sort, they are also agent causes of a special sort, i.e., instrumental agent causes."[50] Moreover, this twofold causality of genes accords well with St. Thomas's general statement that, "the whole of corporeal nature lies under the soul and compares to it as matter and instrument."[51]

At this point we can conclude by saying that we have refuted the above objections brought forth by Barnes and Nichols against St. Thomas's teachings concerning the *principia naturae*. Nonetheless, through their objections, both Barnes and Nichols have caused or at least occasioned us to think more deeply about and to develop certain aspects of St. Thomas's teachings on these matters. For this we owe them our gratitude.

## 9. Résumé

In this chapter we both examined and responded to Gorden Barnes and Terence Nichols's objections against St. Thomas's teaching regarding the nature of substantial form. Barnes maintains, as we observed, that the traditional doctrine of hylomorphism implies certain paradoxes. For example, he thinks that every traditional hylomorphist must both affirm and deny that there is a real distinction between substantial form and the substance of which it is an essential part (and, by implication, he thinks that the traditional hylomorphist must both affirm and deny that there is a real distinction between substantial form and first matter). Barnes thinks

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[50] For a fuller treatment of genes qua instrumental causes than we can provide here, see Richard Connell, *Substance and Modern Science*, pp. 185-190.

[51] Tota...natura corporalis subiacet animae, et comparatur ad ipsam sicut materia et instrumentum. *ST* I, q. 78, a. 1, vol. 5, p. 250.

that we must affirm such a real distinction in order to account for the reality of substantial change. And he holds that we must deny this real distinction in order to preserve the substantial unity of natural substances.

In response to Barnes, we showed that while he is correct in maintaining that we must posit a real distinction between first matter and substantial form in order to explain substantial change, he errs insofar as he thinks that this real distinction is incompatible with the substantial unity of natural substances. In connection with this, we saw that Barnes fails both to appreciate that one must travel over the *via resolutionis* before attempting to travel over the *via compositionis* and to distinguish between things and principles of things. It is this latter error, in particular, which seems to give rise to the problematic part of Barnes's alleged paradox.

After a brief examination of *De anima*, q. 9, which was propaedeutic to our dealing with Terence Nichols's objections against St. Thomas's doctrine, we turned to Nichols's objections themselves. We saw that Nichols argues that because of the reality of organ transplants (and related phenomena), the persistence of the properties of lower natural substances in higher natural substances, and the causal influence that genes have on the natural substances that come to be from them, St. Thomas's doctrine substantial form must be completed by the positing of what he calls "subsidiary forms." Such forms, according to Nichols, would stand between accidental forms and substantial forms and would account for the existence of what he termed "subsidiary wholes."

In response to Nichols, we showed that the very notion of a "subsidiary form" is impossible since there can be no form midway between accidental form and substantial form, just as there can be no being midway between substance and accident. Thereafter we showed that all

three of the realities which led Nichols to posit subsidiary forms can be accounted for by St. Thomas's teachings on substantial form. More specifically, we observed that what St. Thomas teaches regarding virtual presence and incomplete or imperfect substantial forms are especially helpful in enabling us to give a traditional hylomorphic explanation of things such as organ transplants (and related phenomena), the persistence of the properties of lower natural substances in higher natural substances, and the causal influence that genes have on the natural substances that come to be from them.

## Conclusion

The road which we have followed up to this point has been lengthy and, at times, obscure. It behooves us, therefore, to recall some of the principal landmarks which we have passed along the way. Thereafter, we shall attempt to indicate briefly where this road leads should one continue to follow it.

We began, in chapter one, by examining how it is that certain things which we know from our common experience lead us to ask the question, *Quid sint principia naturae*? There we observed that it is principally through seeing that the natural substances which are most known to us are undivided substances of many different kinds which change into one another that we first begin to wonder about what the *principia naturae* are. More specifically, we saw that our wonder about the natures of the principles and causes of these natural substances involves a desire to see how these principles and causes in question account for (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself. Thus, it seemed only natural for us to expect that the true answer to the question, *Quid sint principia naturae*?, would be one which would provide an explanation for these three elements of our common experience of substantial becoming.

In the second chapter we looked at the ways in which five of our predecessors (i.e., Thales, Empedocles, Democritus, Anaxagoras, and Heisenberg) have answered this question. In so doing, we noted that the various answers that all five of these thinkers provided us with necessarily deny (1) the substantial unity of the substances involved in substantial becoming, (2) the differences in kind amongst the substances involved in substantial becoming, and (3) the reality of substantial becoming itself. For they posited as principles of nature either one natural substance which is

condensed and rarefied (i.e., Thales and other proponents of *Monism*), or many natural substances which are congregated and separated (i.e., Empedocles, Democritus, Anaxagoras and other proponents of *Pluralism*), or some combination of both of these views (i.e., Heisenberg *et alii huiusmodi*). Moreover, we came to see that it was with reason that these thinkers were led to deny the things known from our common experience which first led us to ask the question, *Quid sint principia naturae*? For they maintained that the matter or material principle which underlies what we take to be substantial becoming must be either some substance(s) or some non-substance(s). But it cannot be the latter. Hence, it must be the former. Yet, if the former, then they concluded that all three of the things which we claim to know from our common experience mentioned above must finally be illusory.

As a result of this, we found ourselves at a sort of "fork" in the intellectual road along which we had been traveling. Either we could adopt some form of *Monism* or *Pluralism* (or some combination of the two) and, thus, sacrifice a great deal of what we know from our common experience for the sake of having an understanding of the *principia naturae*, or we could reject these positions as false and, thus, seemingly sacrifice an understanding of the *principia naturae* for the sake of preserving a great deal of what we know from our common experience.

This *aporia* forced us to take up a brief consideration of what the proper method is which must be followed, if one is to come to an understanding of the natures of the *principia naturae*. In chapter three, then, we established that, given our natural mode of knowing, the character of our first knowledge of the principles and causes within the natural substances most known to us must be most general in nature. As a result, it became clear to us that only after knowing the natures of these principles and causes in a most general way would we be able to come to know them in a more

specific way.

Furthermore, our consideration of the proper *modus procedendi* showed that in order to proceed to a knowledge of the natures of the principles and causes within the natural substances which are most known to us, we would have to follow what St. Thomas has termed the *via resolutionis* and the *via compositionis* which begin and end, respectively, with our sense experience of the attributes or properties of these same natural substances. In other words, following the *via resolutionis*, we would first of all proceed from certain sensible attributes or properties, common to the natural substances which are most known to us, to a most general knowledge of the natures of the indivisible composing parts or principles (i.e., the inward principles and causes or the *principia naturae*) of these same natural substances.

Thereafter, following the *via compositionis*, we would judge, from the point of view of the natures of these inward principles and causes, that these same attributes and properties which are known to us in our sense experience are really the proper effects which follow from the natures of these inward principles and causes which were discovered thanks to the *via resolutionis*. Since, however, the substantial unity of the substances involved in substantial becoming, the differences in kind amongst the substances involved in substantial becoming, and the reality of substantial becoming itself, on the one hand, seemed to be *prima facie* the sensible attributes or properties known to us in our sense experience from which we should begin our *via resolutionis* and, on the other hand, were jettisoned as illusory by the proponents of *Monism* and *Pluralism* in chapter two, something of our *aporia* still remained.

Hence, in chapter four, we were forced to defend the veracity of our natural judgements concerning these three matters. To that end, we attempted (1) to make clear what we mean when we

say that these three things are "known to us in our sense experience" or are "sensible," (2) to elucidate how we might defend our knowledge of these three things by looking back to certain aspects of our common experience, and (3) raise and respond to three objections which might reasonably be brought against the position that we established. Regarding this first of these points, after distinguishing between what is sensible *per se* and what is so *per accidens*, we argued that our judgements concerning the substantial unity of the natural substances which are most known to us, their differences in kind, and the substantial becomings which they are involved in are either judgements about what is sensible *per accidens* or are judgements about what is rooted in what is sensible *per accidens*.

With this in mind, we proceeded to double back to our common experience in an attempt to show that our natural judgements concerning these three matters are not "'flat earth' errors," as Fr. Dewan puts it. Accordingly, and this is in connection with the second point, we observed that each man in some way understands his own substantial unity (thanks to his internal experience of being undivided coupled with his external experience) more intimately and immediately than he does that of any other substance. But neither is each man closed within himself as regards his knowledge of substantial unity. For we saw how it is that the substantial unity not only of other men, but also of familiar animals and plants can be justly said to be "sensible *per accidens*."

In a similar way, we observed that our judgements both about the differences in kind amongst the substances involved in substantial becoming and about the reality of substantial becoming itself are ones which are firmly rooted in our common experience of the natural world. Lastly, despite various objections which purported to show that our judgements regarding these matters are naively based on our sense experience, ultimately subjectivistic, and not in compliance with proper Humean

epistemology, we defended the claim that the same three things which the proponents of *Monism* and *Pluralism* denied as illusory are truly known to us from our sense experience. Hence, we concluded that we would be able to use these sensible attributes or properties as firm beginnings from which to proceed to a knowledge of the inward principles and causes of the natural substances most known to us.

We then revisited, in chapter five, the ancient and modern answers to the question, *Quid sint principia naturae*? In light of what was established in chapters three and four, we were able to conclude with certitude that both *Monism* and *Pluralism* were fatally flawed positions. More specifically, we made clear that these positions not only violated the proper *modus procedendi* in at least two serious ways, but also falsely posited the material principle in substantial becoming consists in some substance(s). Thus, while it became evident that *Monism* and *Pluralism* were partially false, the definitive resolution to the dilemma which they set forth still eluded us.

Now, in addition to this, we observed that the false answers to the question, *Quid sint principia naturae*?, provided by *Monism* and *Pluralism*, could help us to approach the true answer *per modum disputationis*. Accordingly, we discovered that the proponents of both *Monism* and *Pluralism* all agreed, perhaps because they were forced to this by the truth itself, that there are three principles of nature (i.e., some material principle and two other principles which stand to each other as first contraries). But we showed in the first part of the chapter that the material principle in substantial becoming cannot be some substance(s). Hence, we concluded that most probably the *principia naturae* are three in number (i.e., some material principle and two other principles which stand to each other as first contraries) and that the material principle in substantial becoming is not some substance(s). Yet, since in this chapter we were proceeding largely *per modum disputationis*,

it remained to be seen whether we could arrive at this same conclusion, or one close to it, *per modum demonstrationis*.

In chapter six we attempted to proceed *per modum demonstrationis* to the true answer to the question, *Quid sint principia naturae*? Now in order to do this in keeping with what was established in chapter three, this chapter was divided into two main parts. In the first part, we endeavored to arrive at a most general understanding of the principles of nature. Thereafter, in the second part, we attempted to know these very same principles more determinately.

As regards the first part, and in keeping with what was established in chapter three, we sought out those things which are common to every becoming. By examining first our speech about accidental becoming, then the reality of accidental becoming, and, finally, the reality of substantial becoming, we came to see that every becoming involves matter, form, and the privation of that form. Further, we observed that these same three things can justly be called "principles" of every becoming. In addition, as it became evident that every becoming involves some material principle and two opposite principles (i.e., form and privation), much like what we arrived at in chapter five, it also appeared that two of these principles (i.e., matter and form) were *per se* principles and causes, while the third was a *per accidens* principle and cause, of what comes to be.

At this point, we had arrived at a most general and confused understanding of the natures of the *principia naturae*. Thereafter, we endeavored to know more determinately the matter, form, and privation which are the principles of substantial becoming. We discovered, thanks to various proportions, that the matter which we were seeking to know is nothing other than pure passive ability (i.e., the very ability to be a substance), is aptly called "first matter," desires most of all to be under the form of man, is both ingenerable and incorruptible *per se*, and is one in number in all natural

substances which change into one another.

We named the form which is a principle of substantial becoming, "substantial form," and contrasted it with the principle of accidental becoming known as "accidental form." While the latter was seen to make its subject to be in a certain respect and to be less principal than its subject as regards actuality, the former was observed to make its subject to be simply speaking and to be more principal than it as regards actuality. We also showed that, unlike accidental form, substantial form gives existence both to the whole natural body to which it belongs and to every one of that body's parts. Moreover, while there can be many accidental forms in a substance, there can be only one substantial form in a substance. Connected with this, while it is necessary for certain accidental forms to stand in between substance and some other accidental form, it is impossible for any accidental form to stand in between first matter and the substantial form whereby it is simply speaking. Finally, we proved both that every substantial becoming involves a *resolutio omnis formae usque ad materiam primam*, whereas no accidental becoming as such involves any such *resolutio*, and that every substantial form is instantaneously acquired by first matter, whereas not every accidental form is instantaneously acquired by substance.

As regards the third principle of substantial becoming, namely, the privation of substantial form, we saw that it consists in nothing other than the non-being or absence of substantial form in first matter. As such, we concluded that the privation of substantial form belongs to the "kind" of privation which St. Thomas says consists in "having been corrupted" and which does not admit of the more and less. In addition, we showed that there are as many privations in first matter as there are substantial forms which first matter is able to have but does not presently have. Thus, by the end of chapter six, we arrived at a rather specific and distinct understanding of the natures of the

*principia naturae*. And during the whole course of this chapter we were doing nothing more than traveling over the *via resolutionis*.

In chapter seven we attempted to complete our definitive answer to the question, *Quid sint principia naturae*? Thus, from our more specific and distinct understanding of the *principia naturae* attained in chapter six, we 1) made known what in fact occurs when this substance of this kind becomes that substance of that kind, 2) showed that only a specific understanding of the natures of first matter, substantial form, and privation is able to give an adequate account of a) the substantial unity of the substances involved in substantial becoming, b) the differences in kind between the substances involved in substantial becoming, and c) the reality of substantial becoming itself, 3) provided a definitive resolution to the difficulty raised by *Monism* and *Pluralism*, and 4) explained why the proponents of *Monism* and *Pluralism* have erred in their understanding of the *principia naturae*.

Regarding the first of these matters, we came to appreciate the difference between the *acquisition* of a substantial form and the *eduction* of a substantial form, as well as the difference between a *generatio simplex* and a *generatio continens in se plures generationes et corruptiones*. Concerning the second, we saw that substantial form can be called the *ratio unitatis* in a natural substance and that to the extent to which the substantial form in a natural substance conquers first matter, to that extent the substance is one or undivided. In addition, we manifested the fact that just as the substantial form of man contains in its power the perfections of every lower substantial form, so too, generally, every higher substantial form contains in its power the perfections of every substantial form which is inferior to it. Further, we observed the difference between those substantial forms which St. Thomas calls "perfect" or "complete" and those which he terms

"imperfect" or "incomplete."

In our study of St. Thomas's definitive resolution to the difficulty raised by *Monism* and *Pluralism*, we noted that, indeed, no substance or non-substance can become a substance, if one is speaking *per se*. If one is speaking *per accidens*, however, then both a substance and a non-substance can become a substance. Further, and more profoundly, we saw that the dilemma set forth by the proponents of *Monism* and *Pluralism* rests on an equivocation which stems from an insufficient understanding of substance. For between what is not a substance in any way at all and what is an actually existing substance, there is what is able to be an actually existing substance (i.e., first matter). Thus, we noted that the proponents of *Monism* and *Pluralism* were guilty of the *fallacia accidentis*. And we found there were causes of these men going astray both on their side as human knowers and on the side of the *principia naturae* themselves.

Now in most, if not all, of these things, we were traveling over the *via compositionis*. For, in chapter seven, it was from our knowledge of the indivisible principles (i.e., first matter, substantial form, and the privation of substantial form) that we judged concerning those things that are caused by the principles (i.e., the substantial unity of the natural substances involved in substantial becoming, their differences in kind, and the reality of substantial becoming itself). And it was also from our understanding of these same principles that we both provided the definitive resolution to the difficulty raised by the proponents of *Monism* and *Pluralism* and gave some of the causes of these proponents going astray.

Lastly, in chapters eight and nine, we examined and responded to four relatively recent articles which raised significant objections against St. Thomas's understanding of the *principia naturae*. The articles by John Kronen and Christopher Byrne raised objections principally against

St. Thomas's understanding of the nature of first matter, while those by Gordon Barnes and Terence Nichols brought forth objections principally against his teaching on the nature of substantial form. And even though we found that all of these objections failed to refute any part of St. Thomas's doctrine, we also found that all of these objections moved us to more fully explicate and develop what we had established in the first seven chapters.

For example, due to Kronen objections, we came to see that some substantial forms, such as those that are souls, are one in essence while many in power. And because of Byrne's objections, we not only had to examine more fully what St. Thomas's says about accidents, but we also had to look into his profound teaching on the principle of individuation in natural substances. In a similar way, Barnes's paradox moved us to review and clarify what we had established in chapter seven regarding substantial form and first matter as the causes of the substantial unity in natural substances. And Nichols's objections made us delve into St. Thomas's doctrine of virtual presence and into Cajetan and John of St. Thomas's development of St. Thomas's teaching regarding the disposition of matter.

In addition to making us more fully explicate and develop St. Thomas's teachings on the *principia naturae*, these objections also helped to prove, in the words of Fr. Dewan, that "hylomorphism is a coherent doctrine which does not suffer piecemeal deconstruction."[1] For, from these objections, we saw many times that to deny the doctrine on first matter is to deny the doctrine on substantial form *et e converso*. Let this suffice for a summary of what has come before.

Now our aim in all of this has been simply to make a good beginning in explicating and defending St. Thomas's hylomorphism as the truth of the matter. Accordingly, we have attempted

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[1] Fr. Lawrence Dewan, O.P., "St. Thomas and the Hylomorphic Ontology," p. 5.

to say some of the first things that must be said, if the *principia naturae* are to be known and known well. Whether we have attained our end or not is something that we leave to the judgement of our readers. In either case we have come to the end of our text and, assuming that we have attained our intended end to some extent, let us ask this question: Where do we go from here?

We must look both to the *Physics* (with St. Thomas's commentary thereon) and to the rest of natural philosophy. By the latter we intend not only the remaining parts of the general study of nature (e.g., Aristotle's *On the Soul* with St. Thomas's commentary), but also the experimental sciences which seem to be dialectical extensions of the speculative science that is natural philosophy.

We call the experimental sciences "extensions" of natural philosophy since they attempt to know *ens mobile* in one way or another. Because of this, sensible matter is not only something on which their subject matter depends in order to be, but it also enters into the accounts or definitions that these sciences provide and make use of.[2] And we say that these extensions of natural philosophy are "dialectical" insofar as, for the most part, they do not provide us with knowledge simply speaking.[3] Speaking to this, Warren Murray maintains:

> In trying to understand the differences between philosophy of nature and the experimental sciences in respect to the kinds of knowledge they give us of nature, it is good to reflect on the fact that science, in its attempts at explanation, can at best shadow nature and natural phenomena. It can, it is true, thanks to its mode, arrive at the discovery of many new and detailed facts about nature. But these facts themselves, the more they are particular and detailed, the less they will be certain. We may, for example, be fairly well-assured that when quantum physics talks about virtual particles and quantum voids in space that these expressions do correspond in some way to observables, but we have no assurance that what they correspond to is really what they claim to have described. What the scientist observes, as many great

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[2] In "Abstraction from Matter," pp. 187-196, DeKoninck illustrates how even the definitions of the mathematical physicist depend on sensible matter in various ways. See also, *In de Trin.*, q. 5, a. 1.

[3] See *Posterior Analytics*, Bk. 1, ch. 2, 71b8-16.

> physicists, such as Niels Bohr, Werner Heisenberg, Arthur Eddington, and Albert Einstein, were often wont to insist on, are always simple things at our level of observation. We do not experience elementary particles, we see traces of water droplets in a cloud chamber; we do not observe biological evolution, we find fossils in the rocks, etc. These so-called factual entities beyond our ken are, in fact, largely theoretical entities.[4]

What we are claiming, then, is that despite the fact that our understanding of the natures of the *principia naturae* is presently far more specific and distinct than it was at the end of the first half of chapter six, it is still far too general for us to rest in. Although we know that the substantial form of an animal differs in kind from that of a plant, we should desire to press on to understand what we can of that whereby the substantial form of a horse differs from that of a cow, and that whereby the substantial form of a oak tree differs from that of a cactus. As De Koninck aptly puts it, "Indifference to the phenomena of sun and moon, to bugs and elephants, proves the absence of philosophic temperment."[5] But neither horses, nor cows, neither oak trees, nor cacti can be known with any sort of determination apart from the kind of specialized experience which is the starting point of the experimental sciences. Hence, it seems the philosopher of nature, if he is to attain his goal of understanding the *principia naturae* as specifically and distinctly as possible, must finally

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[4] From his, "Science, Postmodernism, and Philosophy," in Alice Ramos and Marie I. George (eds.), *Faith, Scholarship, and Culture in the 21st Century* (Washington, D.C.: CUA Press, 2002), pp. 129-130. Similarly Charles De Koninck writes: "...I would make a distinction between the strictly scientific investigation of nature, which does not take us very far, and the tentative or dialectical approach to it. I would even go further and state that most of our knowledge of nature remains in the realm of instrumental fictions of which atoms and genes are good enough examples. But in practice they are very potent fictions; and they do bring us ever nearer to speculative truth (speculative, not in the Anglo-Saxon sense, but in that of Aristotle). From this it is plain that not everything a science is about is scientifically known. Most of what we call natural science remains finally this side even of likelihood." See his, "Natural Science as Philosophy," *Culture* 20 (1959), pp. 253-254.

[5] "The Unity and Diversity of Natural Science," in Vincent Edward Smith (ed.), *The Philosophy of Physics* (Jamaica, NY: St. John's University Press, 1961), p. 20. De Koninck seems to be basing this bold claim on *On the Parts of Animals*, Bk. 1, ch. 5, 645a1-a25 as well as *On the Heavens*, Bk. 2, ch. 12, 291b25.

look to the experimental sciences.[6]

Finally, it is noteworthy that many of the philosophers whose works we have relied on in the course of this essay have already more or less undertaken this task. For example, Joseph Bobik, Richard Connell, Charles De Koninck, Fr. Lawrence Dewan, Fr. W. H. Kane, Fr. George Klubertanz, Fr. Joseph Owens, Fr. William Wallace, and others have all recognized the need to look to the experimental sciences in order to make more distinct our understanding of the *principia naturae*. Indeed, at least four of these authors (i.e., Bobik, Connell, De Koninck, and Owens) specifically address Sir Arthur Eddington's two "worlds" (i.e., the substantial world known by our common experience and the non-substantial world known by science), which we encountered in chapter two, and show how finally they are resolvable into one.[7] In closing, then, let us say that we should be

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[6] Again, Warren Murray is helpful here. He writes: "We can hardly know what a man is, never mind a horse or a tulip. But it [i.e., natural philosophy] does aim at this. Furthermore, it has become evident through the last few centuries that natural philosophy cannot come to know these things all by itself; it must take as an ally the experimental sciences, but it must do so, so as to remain wisdom for them. Without the detailed knowledge which biology, chemistry and physics supply about natural things, we will never complete the project that Aristotle set as a task for natural philosophy: namely, to reach to the very elements of things. On the other hand, if we do not admit the role that the more general and philosophical part of the study of nature must play, our knowledge of nature will remain without interpretative principles, without direction, and seriously fragmented." From his, "Science, Postmodernism, and Philosophy," p. 130.

This is not to deny that there is some basis for distinguishing "philosophy" from "natural science." The following text from De Koninck addresses this point: "There is, nonetheless, a historical case for the distinction which we reject in principle. The man who putters in a laboratory may not have time to concentrate upon the outcome of his convenient generalisations. Yet there ought to be some one able to warn us of logical consequences that clash with the whole of experience. No one may possess a head big enough to contain all the knowledge of nature now available; but general, though vague, knowledge, we do have, knowledge which can be explored up to a point without moving on to further concretion. To call attention to the extreme relevance of our first and vague knowledge of reality, the sort that we express in ordinary language, may be the self-imposed task of some people, whom we call philosophers. Still, my contention is that if, in this restriction of their work, they see anything more than a limitation forced upon them by the shortcomings of the human brain, they are projecting this limitation upon nature as if real things stood in different worlds according as they are seen by philosopher or scientist.... So far as I am concerned, I refuse to renounce myself for a mere swarm of electrical charges, no matter how much I may stand in need of them and know that I cannot exist without them." From his, "The Unity and Diversity of Natural Science," p. 21.

[7] See, Joseph Bobik, *Aquinas on Matter and Form and the Elements*, pp. 288-293; Richard Connell, *Substance and Modern Science*, pp. 96-99 and pp. 125-127; Charles De Koninck, "The Unity and Diversity of Natural Science," p. 19; and, Fr. Joseph Owens, "Matter and Predication in Aristotle," p. 47.

encouraged by the example of these students of nature and go and do likewise.

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This text from Fr. Owens gives one a sense of what the general resolution consists in: "In distinguishing his two tables, the solid one he wrote on and the "nearly all empty space" table he knew as a physicist, Eddington failed to stress that his knowledge of his scientific table was constructed from his knowledge of the ordinary table. The scientific construct was the result of understanding the ordinary table in quantitative terms. The same ordinary table can also be understood scientifically (in the traditional sense of knowledge through causes) in terms of substantial principles, form and matter, as is done in natural philosophy. It can also be understood in terms of entitative principles, essence and being, as in done in metaphysics. They are all different account of the same thing, given on different levels of scientific (again, in the centuries-old meaning of "scientific") investigation. All these different accounts are necessary for a well-rounded understanding of sensible things. None of these accounts can afford to despise any of the others, nor seek to substitute for any of them, nor to interfere with any of them. Each has its own role to play , a role that only itself can play. The Aristotelian matter is a principle for explaining things on the level of natural philosophy. On that level it has its own predicates, predicates that still have to be used today in the properly balanced explanation of nature." From, "Matter and Predication in Aristotle," p. 47.

Providing more detail regarding how Eddington's scientific table and commonplace table can be brought together, Bobik asks: "Can one say...that the commonplace table (as a **mixed body**) is just what it is because of the special sort of material and agent causality being exercised by its ingredient **mixables**?, i.e., by its component quarks, protons, neutrons, electrons, atoms, molecules; which are **not only** material causes of a special sort, i.e., capable of **agent** causality (because of certain surviving **active** potentialities or powers, as different from prime matter which is a **purely passive or receptive** potentiality), **but also** agent causes of a special sort, i.e., **conjoined instrumental** agent causes...

"Can one say, further still...that to speak of the commonplace characteristics of things as caused by the scientific components within them is to speak in some way – though without intending it and without being very clear or explicit or complete – about why substantial forms other than the human soul are educed from the potentiality of matter, rather than being created, or generated, or brought out of some sort of hidden actuality? These substantial forms (i.e., all forms with the exception of the human soul) can be so educed, i.e., brought into existence without need of a direct and special creative act of God (since this eduction is within the usual capacities, both receptive and agent, of things in the physical world) by a conjunction of the following: prime matter, properly disposed by an appropriate substantial form and by an appropriate mix of scientific components, like quarks, protons, neutrons, electrons, atoms, molecules, along with physical agent causes of certain appropriate sorts. The same scientific components which actively cause, and passively retain (within the mixed bodies which arise out of their conjunction), the commonplace features of our ordinary sense-perceivable world, provide a complex of disposing receptive ingredients required for the eduction of their educible physical forms. Their role, thus, in such eductions, is that of a set of virtual, dispositional, retrievable, and instrumentally agent material ingredients..." *Aquinas on Form and Matter and the Elements*, pp. 292-293.

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